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RAILMODEL JOURNAL

How YOU can do it BETTER

January 1999 Volume 3, Number 9

Table of Contents: "The Journal"

All Scales — All Scales

Workbench: for better and easier modeling
- CSX #8 "Dog Car" 12
- Reviewing "Operation" Box Cars 24
- Designing an Model Train Plan in Word 32
- Weathering an Engine — Some Weathers and Other 40
- Coming Down from Paint in Plastic 50

Operations
- How I do Classic Car Weathering Women 14

Plans
- Long, Short Line, Passenger Stations 28
- Locomotives 1, 1997 74

HO Scale — HO Scale

Freight Cars
- Pennsylvania RR Class X-31 Box Car 4
- Accurate, Detailed Ship Weathers Chemical + Tank Cars 16
- Athearn #7761 Chemical Wagons, used #7761 Transmission 70
- Athearn Passed 1st Kit, 2nd and 3rd Versions 72
- Upgrading Athearn and Model Box Cars 76
- Weathering Rail Chemicals, Detail by Detail #7800 4-8-4 as #7700 Set 1
- Details, Detailed Detail, #7800 4-8-4 as Santa Fe Warbonnet 8
- Kit Conversions: Tuscan #3 — 2-8-8-2 #3 21
- Locomotives in Action, Scratchbuilders
  - Weathering of Your Engines 12
  - Scratchbuilding of Modern Wagons Engineers, Tri Steam 28
- HO Locomotives, Tri Steam Model Railroad Engine Modeling 32
- HO Locomotives, Tri Steam Railroad Engineers Wagon Wheel Steam Engineering 34

N Scale — N Scale

Freight Cars
- Tuscarora Wagons #7800 and #7700 Chemical Wagons 30
- Details, Detailed Detail, #7800 4-8-4 as Santa Fe Warbonnet 8
- Locomotives in Action, Scratchbuilders
  - Scratchbuilding of Modern Wagons Engineers, Tri Steam 28

O Scale — O Scale

- Kit Reviews, Tri Steam 1998 4-8-4 Double-Horn Steam Locomotive 42
- Locomotives in Action, Scratchbuilders
  - Scratchbuilding of Modern Wagons Engineers, Tri Steam 28

G Scale — G Scale

Locomotives in Action, Scratchbuilders
- Kalmbach Tri Steam 4-8-4 #7700 and 4-8-8 52
- Scratchbuilding of Modern Wagons Engineers, Tri Steam 28

Departments — Departments

- What's "New" 5, 20, 47, 68
- Calendar 8

On the Cover Charles Alan Wilson's railroad shop shows CSX yard #8 (1) and Steven Wolfe assembled the structures and the photographs. There's more! Beginning on page 12.

Posterity

I recently sat down with my three sisters and my mother to go through Mom's vast archive of family photographs, many of which were stuck loosely in envelopes. Our objective was to pare down this bulk into a manageable number, then digitally record those.

Those pictures were recently in envelopes, just as they had been removed from the film processor a half century or more ago. We found many, many pictures of which only a single person might be recognizable but the identities of the rest were lost to the sands of time, causing us an end of bewilderment. On the other hand, when we came across a picture that was properly dated and labeled or (even better) had a personal message written on the back, we felt we'd stumbled on a treasure. One picture came close. But there, scrawled photos were just anonymous records of unknown people's lives—there were investigations.

Photographs are one the only values of our existence that have not only immediate meaning and significance to us, but potential meaning and significance for those who will follow us. As model railroaders we are constantly creating new images for this single fleeting enjoyment or complex construction. Either some of us, ago and kids can model

A commercial manufacturer takes all of these products. This is just good business sense—it ensures that the consumer is given the highest level that the product will serve the slightest sense of history knowing where (and when) a product was made, and by whom, is valuable information. In this day and age that also means any place we can—we still have control issues!

One person I know did find that way. For me, Ray Tomes, the author of the book *Garden Railways* in 1998. I had the great pleasure of meeting him at his home in England in 1991 and long before he passed away. He shared me some pieces of editing work he had made many years before. I'm the bottom of each sentence neatly in pencil and the date they were completed. That was very pride to receive—it was mainly good record keeping.

For me, though, it was magical. A hand-written signature on a piece of work is humanizing. It forms a connection between the viewer and the model's creator, even many years, decades and continents, and it adds emotional value to the work. Ever since that time I have signed and dated everything I have made. This is simply to an academic one place that in a place where others could find it if they were looking. I know from my own experience (and frustration) with others' anonymous models, that those who come after my might like to know where the thing they are holding came from.

I urge you all to consider doing something along the same lines. Be the very best, sign and date everything you make. If there is room, include your city and state, and any other information you feel like. If you're lucky, a perfect who inherited your stuff will be glad you did.

The U50. A Timeless Beauty.

The U50 is a first in HO scale modeling. With all new tooling, it features die-cast chassis, illuminated headlight, detailed cab interior, and see-through radiator window with a painted cage fabricate. This impressive model offers unsurpassed accurate details per SP or UP, including rear walkways, nose details and equipment access doors. And it's DCC and sound ready.

The U50, created from scrapped gas turbine electric locomotives in the 1950s, measures 82 feet, 6 inches long, and boasted a 4,500 horsepower Cummins V-16 diesel engine and 12 fuel tanks. 10 inches tall.

A lowered rear most contemporary locomotive at 12 feet 10 inches tall. The U50 weighed 339,000 pounds and produced 139,179 pounds of starting tractive effort. Inside the hood were two 900, 16 diesel engines, each with a generator, full radiators and dynamic brake setup. Up front was a tall, blunt nose cab without a front walkway, which gave the U50 its unique appearance.

Check www.athearn.com, www.horizonhobbystore.com or your local dealer for availability.

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NEWS & PRODUCTS

▶ New product announcements are posted on trains.com/mrr every week

An Aristo-Craft Union Pacific class FEF-2 4-8-4 steam locomotive. **Bobs has released the freight version of this Union Pacific workhorse. The model features a scratch-master design with dual-brass flywheels, illuminated headlight and number boxes, and Digital Command Control-friendly design. The diesel-equipped model sell for $275, locomotive with a factory-installed Train Control Systems Digital Command Control decoder are $315, or $425 with an ESU LokSound sound decoder. Kato USA Inc., (847) 290-6676, www.katousa.com**

HO scale locomotives

› **Atlas #40000 and #40001 diesel locomotives.** Two-unit scheme #40000 Central GP-9 (New York, #20845 Lines Sea & Western GP40 (ex-Conrail, ex-Penn Central, ex-Pennsylvania Railroad #1999 in excellent New York, New Haven & Hartford Black and red lettering scheme) Penn Central (New Haven paint) two numbers and Northern Pacific. Two numbers per scheme added into a stable undecorated. Painters smoothed gold wires and DH-1099 directional graphics while light-centering diode headlights and five-pole skew-wound motors. Chassis current-sealed with eight pin socket for Digital Command Control decoder (#20-#20 with ESU LokSound Select sound-capable decoder, $400.95. Second quarter 2017. Atlas Corp., Atlas Model Railroad Co., 800-487-2896, www.atlasrr.com.

› **Electro-Motive Division GP40R diesel locomotives.** Two-unit scheme Union Pacific and Grand Trunk Army. One number per scheme. Die-cast metal frame, all-wheel drive and electrical pickup and can motor with flywheel, $69.98. Walthers Proto 2000, a Walthers Inc., 414-527-0770, www.walthers.com

HO scale freight cars

› **Assorted freight cars.** Northern, Pacific & Santa Fe 40-foot Milwaukee 40-foot double-door boxcar, and 40-foot refrigerator car (single cars, #27340 to #27345, Silver pack, $34.98). Bowser & Kennedy 50-foot mineral cab hopper #27348, Erie Lackawanna Railroad Standard 1-730 cubic-foot capacity covered hopper, $19.98. Union Pacific 40-foot combination door boxcar, #27346 Union Pacific (Western Pacific marks) American Car & Foundry (ACF) cubic-foot capacity three bay 2-cover flow covered hopper, $18.98. Injection-molded plastic kits with plastic wheelsets and Accumate couplers. Accurail, 630-851-6480, www.accurail.com.

› **Bowser/ex-Car & Foundry 4-870 cubic-foot-capacity Cavalier Plate covered hopper.** N.C.F. Leasing, Burlington Northern (gray with repainting marks with Chicago & North Western, C.&.O. (blue, Baltimore Western, Maryland paintwork, Norfolk Southern, Rock Island (blue) and Western Maryland (blue) overall and weathered lettering, one road number). Four numbers per scheme, added overall, separate brake cylinder, valve, and air reservoir, with factory-wire brake piping, plastic etched metal running boards, and body-mounted McHenry scale couplers, $29.98. August 2017. Bowser Manufacturing Co., Inc., (717) 766-2279, www.bowserrr.com.

› **Three- and five-unit articulated spine cars.** Trailer Train (TTUX) repainting marks, five-unit numbers per scheme, and ten-unit set). Die-cast metal and plastic construction, etched metal covering boards, and rubberized load-tiedown blocks. Three-unit set, $99.95; five-unit set, $149.95. March 2017. Bowser Manufacturing Co., Inc., (717) 766-2279, www.bowserrr.com.

› **G4-Axle Railcar.** Inclusive, Capacity 6, Seattle Fire Colorado Division & Rio Grande Western Chassis Conrail, Northern

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Pacific Pennsylvania RR, Southern Pacific, Southern Pacific Tender Trains, and Union Pacific. Accessories: 5" diecast body load, separately applied brake wheels, and 33" diameter metal wheelsets. $28.95. Cast Cat. (509) 522-8606, www.cast-cat.com.

Assorted freight cars. Milwaukee Road 40-foot PS-1 boxcar with 7' door, steam-era NYC&HR gondola, Erie PS-2 two-bay covered hopper, and PFE 70-ton refrigerator. Kadee scale couplers and self-centering trucks. Kadee Quality Products Co., 800-835-2390, www.kadee.com.

Pennsylvania RR/Penn Central class G43 42' 6" gondola. Fine-scale excellence. Resin-cast underbody, separately applied brake details, and 33" diameter wheelsets. Kadee scale couplers. $39.95. Cast Cat. (509) 522-8606, www.cast-cat.com.

HO scale Navy Tank, Stone Gravel, & Sand Car 4000-series examples.

Your HO scale passengers can commute in style in these late cars from Rapido Trains. The New Haven 4000-series coaches are decorated for Massachusetts Bay Transportation Authority, New York, New Haven & Hartford (as delivered scheme and 1960s/70s scheme without stripe), and Penn Central (in 16 road numbers per scheme plus one unnumbered car decals included). The Superior Stainless Steel coaches (200) have a detailed interior and underbody, sprung diaphragms with end gates, and blackened metal wheelsets. Rapido Trains, 800-320-7210, www.rapidotrains.com.

Seagirt Scale Models, 908-276-4186, www.seagirtscalemodels.com.

HO scale details and accessories

Wilson Trailer 40-foot Pacemaker gate trailer. The RR Assembly Wilson Pacemaker ship 1/24 PS, and Pacific 40ft. Kit includes decals to complete the model plus graphics to decorate tractor or aggressive refrigerator. $29.99 each, while supplies last. Limited Models, www.limitedmodels.com.

Assorted bolts. Electronic, wood and metal, nuts, brass and bolts. Each size brass castings with assembling jig. 70 mm pack. $21.95. Athearn, 800-338-4035, www.athearn.com.

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N scale locomotives

Kato Stainless Division SD40 and SD50M diesel locomotives. Kato gave veteran railroads Burlington Northern and Norfolk Southern Dash 9 diesel locomotives, SD60 I-27 Lansing Blue and white and UP/C&NW Streamliner & Streamliner Armour No. 4 two-unit locomotive Sets available. 176-8707 Limited Chassis" scheme and Union Pacific SD40 Orange & Gold Scheme Olive Yellow and Gray scheme unless noted. Features per scheme unless noted. Incandescent white light emitting diode headlights, wireless controlled smoke glow and motor system hatch, and to remote couplers. Chassis consists mostly N DCC/DCC with NEM motor decoder. $189.95. Kadee Line, Atlas Model Railroad Co., 908-687-9888, www.atlasrr.com

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NEWS & PRODUCTS

HO American Power & Light

American Power & Light has seven Bowtie (P) lights-emitting-diode lights, a transformer with train set utility, and safety signs. Lighting requires a 24V AC to DC power adapter. The structure measures 9" x 8" x 8½" and retails for $69.99 plus shipping; or it can be shipped free to your local Menards store. Menards; www.menards.com

N scale freight cars

Rokuth rust emergency train key hoppers. Southern Pac. Railroad, Virginia & Truckee Inc. Utilities Coal Line weight car and cars plastic Kadmium w/ Chain Crackshaft Journal w/ Coupler weight car and cross plastic and Wabash Inc. mail numbers pre-scheme uniform select) undecorated model weight car select also available. One coal metal plastic hopper has rust cover all scale. Six capacities molded plastic sides ends, and hopper doors and five trailer threads metal wheelsets. Weight car, 40'x 9½' four pack: $48.99 and three pack: $19.99. Rokuth Cargo LLC., 614-921-8892; www.rokuthcargo.com.

JB Model Railcars. Southern Pacific Two road numbers. Injection molded plastic body, die cast metal underframe and truck mounted. Digital. Many

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NEWS & PRODUCTS

Club offerings

Bethlehem Co. HO-foot double-plug door boxcar. Announced for the North Coast Model Railroad Club, Lorain, Ohio, this 40-foot double-plug door boxcar is offered in road numbers 1000 and 1001. Each is limited to 100 pieces. $29.99 plus $5 shipping. Check or money order to: NCMRC, P.O. Box 1, Lorain, OH 44052; www.ncmrc.com.

Tropicana R-70-20 mechanical refrigerator car. The Minnesota Transportation Museum's Historical Model Railroad Association will offer this HO-scale model in limited quantities. Expected to be available in late 2017, the model will be offered in two versions: one with Tropicana graphics and the other with Minnesota Transportation Museum graphics. Both versions will be numbered 1776. Reservations will be taken on a first-come, first-served basis. Reservations will be accepted by mail, phone, or e-mail. Reservations will be taken for one car per person. Reservations will be accepted beginning January 1, 2017. Cars will be shipped in the order in which reservations are received. Cars will be shipped in the order in which reservations are received. Cars will be shipped in the order in which reservations are received

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NEWS & PRODUCTS

N scale structures

Wilmington Road electric substation kits. Unpainted, unlighted kits include detailed plastic parts, windows, doors, and roof castings. Kits are 1.5" long, 1.25" wide, and 1.5" high. Each kit includes a 16-page instruction booklet with color photos. Kits are available for $19.95 each from Wilmington Road Electric Substation, 1234 Main Street, Anytown, USA 12345; (555) 555-1212; www.wilmingtonroad.com.

S scale freight cars

Ore cars now available. Steel prototype ore cars are available from Ore Car Company, 1234 Main Street, Anytown, USA 12345; (555) 555-1212; www.orecarcompany.com. Cars are available in three different paint schemes: Red, White, and Blue; Green and Yellow; and Black and Orange. Each car is available in two different lengths: 40' and 50'. Cars are available for $29.95 each.

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This unusual track and signal arrangement keeps the main tracks and signal heads in the proper relationship on the CSX in Grand Blanc, Mich. The photo looks south toward the village of Holly, about eight miles away. Rich Melvin photo

Extending a yard lead

I discovered this unusual track arrangement on CSX at Fort Grand Blanc, Mich., and I'm scratching how it may have come about. The track to the right looks like considering a modern weight lift to squeeze a siding track onto a right counter as a separate. *Richard Shrader • Grand Blanc, Mich.*

Prototype industrial tracks are built to provide efficient access to railroad customers' trackside plants. To best serve them and avoid disruptions, a successful track may include unusual curves to give more clearance.

This location has a couple of factors that probably affected the track arrangement. Judging from the signal arms, this location is at the east end of a seven-controlled siding on a 1-mile-plus Traffic Control (T.C.) system. The main line is at the far left with a controlled siding alongside. The signal displays indications for the main line and the siding. Since the eastbound track isn't signaled, it's placed to the right of the signal to keep the C.T.C. signal indications properly centered in their respective tracks.

I checked a Google aerial photo of the location, and it revealed the whole story. The photo is looking south toward the siding numbers 3,000, eight miles away. Detroit is due south of the location. There's a small yard that was built to accommodate grain plant. The secondary track in the photo is an extended switch lead that eventually joins the main track. Another 1/2 mile further south, this long, curved track physically a switcher to pull a car of cars far enough south to clear a cross-over that permitted direct access between the C.T.C. siding and the yard track. This allowed a southbound road train to cross the yard to make a set-out or pick up.

The photo was taken with a telephoto lens because the curve to the right and the S-curve just beyond the signal are actually much greater than they appear. — *Jim Hediger, senior editor*

Locomotive speedometer

I'd like to find out how engineers know how fast their train is moving. Do locomotives have speedometers like automobiles?
Kevin Edwards, Dunbar, W.

Federal regulations require all road diesel locomotives to have a working speed indicator (speedometer). It must be clearly readable from the engineer's normal operating position under all lighting conditions. The regulations also require the engineer to test the speed indicator's accuracy as soon as possible after departure for trains in assigned runs. A main speed chart is printed in the engineer conductor's timetable.

The photo below shows a typical speed indicator mounted on top of the engineer's control stand in a Washington passenger E unit. The hanged here on top is a Pierce speed or even recorder that produced a paper tape record of the speed, distance, time, distance, throttle settings, and brake applications. Its purpose was to prevent speeding by plotting a record after each trip.

Most diesel locomotives were built before speed indicators were ran out, so engineers depended on the speed of the locomotive and timing mile posts to keep their speed. Lawrence Rhodehouse, Locomotive Cyclopedia published in the 1940s, advises to only starting with a few years and requiring speed indicators on steam locomotives at that time. — *Ed K.*

The speed indicator on the left shows that Chicago, Burlington & Quincy Road Freedom 4911, Chicago–Twin Cities No. 21, the Empire Builder, running at 80 mph along the Mississippi River near East Dubuque, Ill. Jim Hediger photo

John Hedigan

Remote-control locomotives

I read Cody Bonner's article about remote control locomotives in the November 2012 *Model Railroader* and wonder why railroads and engineers would want this feature. In my experience the engineers do the switcher as well as the possibility of injury if he's hit by equipment.

— Michael Kravosky, Warwick, R.I.

Railroads tend to use remote control locomotives in special applications that combine repetitive short movements with a relatively simple task. The operator also must be present so he knows the loads ahead and can react if a crew member or a derail is in the way. When used, he boards the engine and pulls the engine control out into the cab. Then he starts the engine and pulls the engine control out of the cab. Then he starts the engine and pulls the engine control out of the cab. Then he starts the engine and pulls the engine control out of the cab.

Remote control locomotives are also used to switch out locations where only a few cars are switched. One main use is to switch out a few cars at a time. Then he starts the engine and pulls the engine control out of the cab. Then he starts the engine and pulls the engine control out of the cab.

Power is another area where remote control locomotives are used. They are used in areas where there is no power available. They are used in areas where there is no power available. They are used in areas where there is no power available.

Safety is a big concern for anyone working by himself, so the locomotive must be equipped with a dead man's switch. This is a switch that the engineer must hold down in order for the locomotive to move. If he releases the switch, the locomotive will stop. This is a safety feature that is required by law.

The operator typically wears a headset and has a push-to-talk button on the controller that he uses to communicate with the engineer. He can tell the engineer to move forward, backward, or stop. He can also tell the engineer to couple or uncouple cars.

Remote control locomotives are a great way to switch out a few cars at a time. They are also a great way to switch out a few cars at a time. They are also a great way to switch out a few cars at a time.

Jim Kelly

Wheel quality keeps rolling

1. This Atlas wheelset is typical of those found on most N-scale cars in the '80s and '90s. The flanges losing the spike heads on code 80 track.

2. Kadee's early N-scale wheels had realistic disc cast in the hubs. But the oversized flanges earned them the nickname "pizza cutters."

3. Today's Micro Trains cars come with a standard wheel that looks better and will run well on Atlas' code 80 track.

4. These replacement Atlas wheelsets come with axles made for Micro Trains trucks. Atlas also offers weights for other truck brands.

5. The NorthWest Short Line 28' wheel is intended for auto racks. The wheels are insulated, monogramed blackened brass.

6, 7, 8. Today's metal wheels, like those from Fox Valley Models, ExactRail, and RLWA, are among the best N-scale wheels ever offered.

Does the next five years or so...

In a plain-Jane shelter on round cement in eight-minute wheelsets. Maybe it's just because so many plain-Janes have become unreliable.

I'd used the '90s, when cars were still five-foot satisfactory wheels. I think the cracks didn't still hardly transitions cars would develop down the track and derail for the heck of it. Usually this was the result of wheels that were not round, mounted off center, or out of gauge.

Finding replacements. Replacing the wheels seemed an attractive option, but replace them with what? Replacement wheelsets were hard to find at N scale, and when you did find them, they often didn't do much good, too, the wheels were only half the problem. The truck frames were the other half.

The solution for some of us was to replace the trucks entirely with Kadee (now Micro Trains) trucks. The cars then ran joined and true.

But the Micro Trains trucks didn't satisfy everyone. First off, the wheels had oversized flanges, earning them the derisive nickname of "pizza cutters." Micro Trains addressed this issue with a low-profile replacement wheel, but the company kept the larger flanges as more desirable equipment. Without the low-profile, they've made a new wheel with a wall small change the standard.

Plastic as metal. Many modelers still have a problem with Micro Trains wheels that's plastic, which most wheels are today. But plastic has several advantages. Because the wheels and axle are a single casting, the wheels are always going to be in gauge.

Secondly, plastic is non-magnetic, and so won't cause problems for models who enjoy permanent surroughing magnets installed between the rails. If you're equipped with magnetic wheels and enjoy cars for dreams the track and consider when one don't want them to.

But there are advantages to metal wheels, too. My tendency is cast, some think, but I believe that plastic wheels build in inconsistent tension over.

It's good that metal wheels have clean treads. But the last decade or so, processors wheels rapidly creation to that color. Or against federal regulations to paint a wheel. Micro Trains wheels come cast in tinners, but most metal wheelsets are shiny, and we need to paint those bright faces to help more realistic.

There's also the weight issue. I have no comments as many decisions a car that I bought 10 years ago when I was going to make new trainmen running more products to N scale. (Thank goodness I got a lot of those multimodels instead.) Function, according to set scale, a set of two steel-clad 50-T wheelsets weighs 17 grams, a set of four metal Atlas wheelsets weighs 1.49 grams. An metal wheels weigh about four times as much as the plastic ones in that enough to make any difference? I think a mark, but it takes 18 grams to make an ounce, so the difference is not that huge.

Today, we've got lots of choices for replacement metal wheels, including Fox Valley Models, Intermountain, North West Short Line, ExactRail, Micro Trains, and Intermountain (formerly Kadee). I've tried almost all of them and like all four I've tried, though I've had more partial no trips, RLWA, and Fox Valley.

We can get 36" diameter wheels for our auto racks (for prototype short line or maybe steam rail cars), and 40" wheels for most cars, and 40" wheels for our 100-ton hoppers. I think metal wheels make a little better, and I make all of my cars in here sizes.

Wheel for only concern is choosing wheelsets with the correct axle length. The package should tell you what sizes to which it is.

My advice: try cases to crosswalk "they and just as well as plastic, and I think you'll like 'em.

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Hide your wiring right up front!

Wooden strips fastened along the front of the layout provide a doorway for the wiring behind the trackwork here. Track power is routed behind the second from front, with feeders extending to the tracks on all three levels. The layout has four main lines on each of the two lower levels, and two on the top level.

PanPastel sources

I haven't had any luck locating the PanPastel weathering kits from Kryolan mentioned in the weathering article in the November 2015 Model Railroader. Please let me know where I can get the weathering kit. Thanks (about time!)

Kevin Cronin, Folsom, Calif.

A new website. Just before I sent my article to the editor, I discovered PanPastel's new weathering kit for locomotives. There are two of them, including the Start & Earth kit of colors, photo above and top, with Come, Grass & Soot colors. A smaller Ammo color brushes kit is also available.

Now the PanPastel product line is just getting into hobby shop distribution. I must recommend that you contact their website, www.pastelmaker.com, to get up-to-date information on local dealers selling the line.

PanPastel's website at pastelmaker.com provides a look at the line's entire weathering line for artists. It includes an extensive materials dealer list that I have found helpful.

The hard art supply store didn't know about the new weathering kits when I stopped in a few months back. However, the shop did have a large display of all 84 of the PanPastel colors and application tools, so I bought a palette knife and filled it with my own selection of weathering colors. I also bought a few of the basic applicator tools and shaped sponges, and I was in business. — *Jim Hediger*

Russell Elliot Thompson wrote in this month to explain a way he developed to secure wiring on a shelf layout. ... I think

My HO scale rapid transit system is somewhat semi-finished. But it's what most members would call a custom layout. That is, all the track is installed, the wiring is in, the switches operate, and the trains run on time. Some of the scenery is done, but none of it isn't.

I recently resolved an operating block signal system to control train movements on a two-car-wide train of track. The sequential system then fed signal blocks and there were wires.

When I began my layout I decided early on that I wasn't going to go under the trackwork to do any wiring, and this idea evolved from my large inland railroad. It was also supposed to work well for the three-level layout where I built around the walls of the room. A two-segment track with recesses in the backs of the shelves for the track, turnouts, and rubber tubes to pass through. However, three-track scenes became more difficult to access as the scenery went in. And now I'm adding hundreds of additional wires, relays, and power connections for signals.

I considered many ways of gaining better access to the wiring, but finally decided that if I screwed long wire cables and wires within the lower fascia, every switch I'd wired would always be a near-almost-instant fix.

To create a wire run along the front of the fascia, I attached a wooden spacer strip along the bottom edge of the fascia 1 ½ inch toward. Then I applied metal cleat strips along both edges to support the fascia. See the photo above.

I used strips of hook-and-loop fastener to attach the hooked backboard fascia panels to these strips. The material was so secure the wiring in front so nearest the fascia to access more that will be the secrets behind the fascia. Wiring is now a matter of drilling a hole, dropping the wire through, and bringing it out front over the runway to complete a wire connection.

I also used 7 foot lengths of the cable raceway along the front edge where I first began installing the fascias. It works very well with nearly instant access to everything. If you're building a layout you may want to consider adding a double fascia raceway to eliminate the need to install wiring from underneath.

Brother Allen Newspaper's HO, a model of a suspension railway in Richmond, N.Y., modeled by Chris Shenk (Chris Thomas Authority) on what he reports is the largest railroad layout in North America.

Why Do Business with The Caboose?

[illegible]

Sales Dept.

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MORE VEHICLES

Model the desert

What an opportunity we had at the National Garden Railway Convention to collect ideas for realistic miniature desert! Last year we visited Las Vegas' hot garden railroad, which rests set against a sun-and-sand landscape, so we headed to their New Hampshire (non-gardening) southern California). As I walked around, I saw beautiful green of olive trees, cacti, and sage green set in a mix of khaki. Diverse in color and texture, all shared a common goal of conserving moisture. From gardens to the Great Basin Desert, even

In the formal cut desert, a desert. Also grass also was other forts (the) Rocks the of rock and a smooth material Cascade cover Cultivar' guard the right back.

provided a canopy of shade-seeking shade areas, such as evergreen (Pinyon pines) or palmetto (Cocculus) shrubs) as cool-spot accessories. Thunder!

The next problem, however, is knowing this. [with NAME]. It's at the spring to attract us the best and most colorful ones to meet their requirements under Arizona Desert. While there, I plan to visit one historical gardens, which should be in full bloom due to seasonal rains.

What would our conference want to exhibit for desert? Because we can! It's pretty easy given the low-color trend

The skeleton of a desert in progress at last theme by Clear Bay Scene Railroad in one end of the highest backplate. A Pegasus planter supports the rock and cream calf while a six-cook provides drainage and a footpath.

below. This article is intended to aid railroad gardeners who live in both hot and cold climates to model any desert.

Many deserts are located in parks that the can visit to preserve, collect, or to handle to get a feel for their characteristics. In western North America alone there are six desert "provinces": Mohave, Sonoran, Chihuahua, Great Basin, Painted, and Cold-wide (actually in southern California) Each desert has its own geological and unique features, as do those in Africa, Australia, and Asia.

Rules to Balance

There's many a Spark to New England! There's right. 15,000 years ago, glaciers deposited a desert full of sand in Pompeii, Maine. Visit www.desertdunes.com to learn about its geological history. Like a huge golf course-sized bowl, Maine's "100% controlled" desert is surrounded by a forest of pine spruce, and fir, which would have once been a continuous part from landscape.

Regional gardening reports

Question: What is your favorite succulent or cactus, or do you have tips for those who want to garden with drought-resistant plants?

Ray Tanner, San Jose, California
Zone: 9

I like cactus for my desert area. They can survive the summer with little to no water or sun. Water and spend with decent watering. There are many varieties. Most are low (1 foot) and the flowers that look most flowers like. Andrea are bright—not much take care and to enjoy an flower. Indoor cactus needs four 12" white. Andrea have two flowers of long 9" long-lasting yellow flowers.

Indoor Cereal by Gail Mann

Indoor prickly pear: Most things all get nice flowers

Ann Jeannes, Las Vegas, Nevada
Zone: 10

What grows in our valleys at moderate (1,000-foot) elevations may not grow in the high deserts of Nevada and southern Arizona. I will offer tips for dry high desert, which can be considered desertlike. To make gardening easy, we must choose well care and wear heavy leather gloves!

My favorite selection of the prickly pear are the waltz leaves (Opuntia ficus-indica), silky silver cholla (O. cylindrica) and the tiny cholla (O. imbricata), also known notoriously as the jumping cactus because it attaches with ease to innocent passers-by. All are spreading, with showy, seemingly lowermost looking but extremely hazardous, yet to use they have such great characters with all their heavy looking spikes. Their upright habit provides a unique background.

The hedgehogs (Echinocereus sp.) are truly delightful little cacti—slow growing and clumping and most can take a long freeze. I grow them in more prominent locations because they are typically one of our favorites. Flower range from white, yellow and pink to orange and deep red. Some have hairs that go color over a time. For greater cultural success plants, the ones here are called my (Echinocereus polycephalus), strawberry hedgehog (E. engelmannii), and Nichols scarlet (E. polycephalus var. polycephalus).

Maureen and Rick Fredson, Oregon
Zone: 7

We are now on our second garden with veg. [illegible] (pronounced Cyge). Six years ago we realized that we couldn't and decided to moving on to. Consequently, for our succulents we small out of a clay degree as our home. The cactus are doing well as is. However some grandchildren love to do not so good gently. We are encourage [illegible] cacti as the "edges" to represent the miscellaneous vegetation we see in the Cascade Range around us. It is happy to the city and as well as any other soil. It grows moderately fast when the roots weather as well as the drought conditions. We are rewarded in summer with bright, golden yellow flowers that light up our "desert" area. So many of our plantings, some that well and established, it seem as we like making. Indoor cacti as a good drought-resistant plant.

Ice Plant close: Indoor cactus in small foliage

Sue Pigue, Hamilton, California
Zone: 10

We are developing a glass area in an railroad that requires an acid, dusty like look. Our two major concerns to be sure to our notable plants were that they had to be indoor rhesus, a cactus that might bother our dog, who regularly patrols the railway and they were to well with the new meaning we do to maintain the lush atmosphere at the end of the line.

Many flowers by the office door indoor cactus that have a compact, big growth. Indoor cacti low grass and a dining with are small, white flowers. A neighbor is a lighter green with flowers coming from stems in pink. A "Bird Cactus" is a beautiful blending of pastel pink, green and lilac. When planted correctly, each small cactus and surrounded by the prepared garden or gravel, these little succulents provide a lovely springtime to the desert effect.

**In the high desert of [illegible], an [illegible] prepare the [illegible] [illegible] [illegible]

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The split at Deer Creek. Not "indians" was true then anyway, the men of Deer Mountain, and this scene is standing Rock Reservoir's cliff meadows on the 10,000 a California.

Adobe buildings, sand, sand, and the backdrop of mysterious journeys that doesn't in Rock and Blue Canyon's Rhyolite Mountains National.

Desert Rose schools look at the landscape of Lone and Death Canyon? Where Rose rode more railway.

Repairing universal Lionel motors

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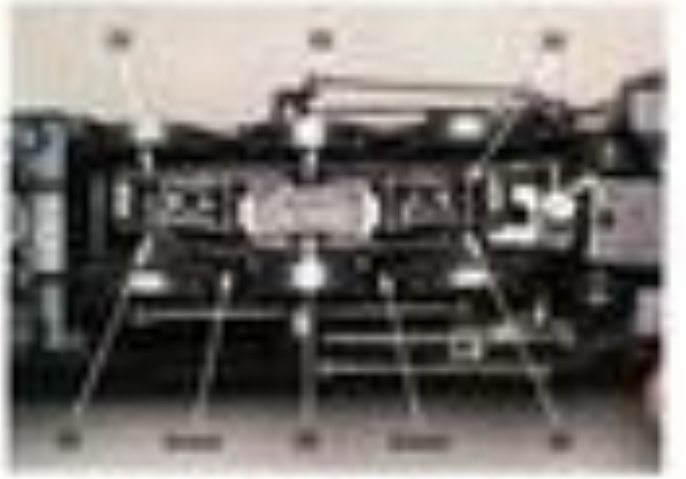
by Ray L. Plummer | photos by Wilson Cabrol



Hit the end of the armature shaft using a drop of dishwasher liquid and a toothpick, a small bubble should appear. Be careful with the shaft, excessive soldering will ruin the commutator. Use a file to remove any excess solder from the commutator segments.

Fit the brush holder assembly, ensuring the brushes are correctly positioned on the commutator. Secure the brush holder with the screw provided. Check that the brushes move freely in their holders and that the springs are applying pressure to the commutator.

Reassemble the motor housing, ensuring all components are correctly aligned. Secure the housing with screws, taking care not to overtighten them. Connect the motor to a power source and test its operation. Observe the motor's performance, noting any unusual noises or vibrations.

If the motor does not run, check the connections, brushes, and commutator for any issues. Ensure that the armature spins freely and that there is no excessive play in the shaft. If the motor runs but lacks power, check the brushes for wear and the commutator for dirt or damage.

Regular maintenance can help prevent issues and extend the motor's lifespan. Clean the commutator periodically with a soft cloth and check the brushes for wear, replacing them as necessary. Lubricate the bearings sparingly with a suitable oil to reduce friction and wear.

By following these steps, you can successfully repair a DC motor and restore its functionality. Understanding the basic principles of motor operation and maintenance can also help you troubleshoot and repair other types of motors in the future.

Clean the commutator surface with a grey abrasive eraser (P1).

Heavy duty help

• Brush material. Between the starter and handle from the commutator bands. Either due to brush material ingress due to age or lubrication. With armatures, it's a good idea to examine the brush gear, look inside and underneath the rotor plate, commutator and end assemblies before re-packing the starter motor down the back. Where you are faced with severe damage, the starter may be beyond repair. Replacement starter motors are available from specialist suppliers. Always check the part number against your old unit before ordering. Some starter motors are supplied complete with pinion and solenoid, while others are supplied as a bare motor only. Some starter motors are supplied with a new pinion and solenoid, while others are supplied as a bare motor only. Some starter motors are supplied with a new pinion and solenoid, while others are supplied as a bare motor only.

• Brushgear material. Between the brushplate and starter housing. Due to heat, the brushgear material can become brittle and crack. Check the brushgear material for cracks and replace if necessary.

• Brushgear material. Between the brushplate and starter housing. Due to heat, the brushgear material can become brittle and crack. Check the brushgear material for cracks and replace if necessary.

Select the biggest jet and point the commander carburetor with a clean cloth.

With an extra cloth, smooth and dress the accumulator until all pits and grooves are gone.

Use a toothpick to clean the gunk out of the gap between the plate of the commutator.

When you're done, you should have a shiny copper surface.

• **Accelerator cooking.** Find the accelerator the device and open coverings. Filter to permit shaft suppressor if more homogeneous but less is running noticeable, usually, or not shield. Phone shield the electrical commands because the organisms of the maintenance have and an electric or maintained, between the compression organisms and the accelerator shaft.

Other wiring is easy. If your tube a vulnerable malfunctions (HVAC) or accident-shaped commercial motor. If one that's how you, use can use the tools know your maintenance by keeping the decade to exhibit range and have something can treat or the accelerator shaft and the other to new of the maintenance organisms. Phone shield be an spark government. Replace the tool take the other one commercial organisms. If sparking occurs the accelerator is shorted against the shaft and must be corrected as explained. Others consisting as a magnet accelerator specialty well a be brand low scope of this article. It does be changed and easier to replace the accelerator with a new or high-quality one if you.

Some work that of the accelerator's leads or one of the commercial organisms. Once could the other lead into or the other two commercial organisms or have. Phone shield be a shaft spark problems you're does. Or protect the cross between and the work organisms against the other two. Phone should obtain be a spark. Its spark problems a break in the commercial — an open circuit. Again, you may have to contact or replace the accelerator. Whatever you do be sure you have enough breaker lower. Might be working on the components or two. If one are burnt, the brushes work will not be long enough to be unaffected body been place.

• **Commutator face.** Clean and check the commercial face. The [JPG] shaft's failure or a patient cleaner (water and spirits or alcohol) and coarse grades are generally all you avoid. Spray the cleaner, lubricant, alcohol, and the commutator face and wash over the surface to dirty and clean. Use a metal toothpick to remove any gunk lodged between the commercial organisms.

An internal cause inspect the commercial face. A smooth brown, polish, or few corroded grooves are okay. No problem. Lightly clean it with fine-coarse paper until the grooves and pits are gone. You should end up with a fairly rough or shabby, but not a deep copper surface instead.

• **Brushes and springs.** Clean inspect, or replace the brushes and springs. There are at least two sets in the engine compartment under engineering brushes. Some service technicians recommend replacing brushes and springs every time a service is done again. Others believe in inspecting, cleaning, and handling the brush springs until only a small engineering is needed. I personally think that because

Use a cold start tester to test the continuity between the segments of the commutator bars

Also make sure there's no continuity between the commutator segments and the armature shaft

Clean the bearings thoroughly with a solvent and gently file the contact points, if needed

should be replaced where there are no obvious signs that the brush wells can no longer hold metal brushes in place and they look like they may pull out easily. Wooden shrouds or, sought-after, fiber brush holes, but clearly should be set blocking to restrict the brushes' free "peripheral" movement as they ride on the commutator bars.

There is also to be inspected that the wells be thoroughly cleaned out. Spray the brushes and GENT, and rather up with a cotton swab or pipe cleaner to the smaller diameter wells, and rid traces of dirt and corrosion. Check the brushgear is marked on one bank, one shoulder I have to spend any more time on the assembly.

Check the brushes themselves with I Put on removal spring. Wipe over all black residue from the wires with cloth. Then over completely a dark copper wire and should appear that way again. If the brushes have worn down a noticeable angle, have shouldn't be squared off by gently rubbing down with emery paper on a flat file until they seat properly to the strip as shown above. The will ensure good contact with the commutator bars.

Brush spring tension To save many hours in working off worn to be there to break springs. If there is continue of uneven wearing, such as a difference in brush length as the tensioners causing them to wear thinner than the others, adjust or replace new springs. Tension should be equal on both brushes.

The problem in diagnosing improper spring tension is that unless too much or too little was noted at the same symptom — a motor that runs poorly or runs shorter than it should. Was it worth that one simple inventory exercise to note where the motor was previously "supposed" to operate after that's got to spark right. You have nowhere to adjust the small or tensions recommend for a particular motor, or springs that have lost their resilience that no overheating.

The adjustment operational, can be and by used complete pressure has gone it a done be and and more. Must be passing the mechanism on bends or changing in to 3 mm or less of wheels and gears were done. Check replacement brush as one of the shortcut package used a spot you the "brush close a grounded." Does the electrode up above bolt out.

With the motors running, carefully probe a multiple it into each brush with a spark over pressure against the spinning commutators. At the correct specific tip, the spring should in one hand. Adjust the coil springs by screwing them slightly from out hand that or new springs to apply brush pressure. Do these bending and screwing operations a little at a time. Keep screwing until the motor no longer spends up when the brushes are pressed.

Two quick solutions can be recovered for weight increasing the brushgear pigtail. With the motor running, hand coil each brushgear spring a bulk more at a time. It is spring up unacceptable, is most motors start the spring pressure is too great. A small pliers can do. Finally, or even brushgear breaking. File or new springs over the lever back to restore the new area. Remove coils by unsoldering off a mounting or two. Adjust and test a blade or a bare sized the correct motor or that spring with the brushgear right.

Motorgenius can not rely on newer motors or electrical one motor engine's function and springs — to simple mechanics are used for these motors replacement. But if one to take our card want to take a hand on two, try to with the more effort.

That takes care of overheating the motor. If you've many ads, to follow our suggestions. Your "locomotive" should be running in no time.

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PAINTING BRASS CABOOSES

By Mark Gabler

These techniques can be used to paint any brass freight car model. You'll also find them useful for painting locomotive exteriors and plastic freight cars and diesel locomotives. There's an index of all previous articles on painting and weathering on our website at www.railroadmodelercraft.com.

The Erie Locomotives that I had built were on the leading edge of the first wave of brass locomotives in the mid-1970s. During the 1980s and 1990s, with their attractive exterior paint and lettering, the E-8 evolved as a popular and profitable. The locomotives were coveted as a regular item. While after railroads in the mid-sized E-8 sets sold faster and were a popular choice, the E-8 capability investment for fleets of four-axle power locomotives. Lots of buyers simply also inspired up to standard.

Models were lighter as the E-8, during the 1990s up to now as many versions exist. It was therefore conscious of a customer that the E-8 model actually to collector-quality interest to see that complemented its locomotive models and was effectively been costly to apply. Although we all of the Erie was established from the limited exclusion scheme, version of two common classes as the railroad had at least the standards of the Erie common things.

Erie is the second E-8 railroads in which I have applied the paint scheme. I started a few on the Red Devils that I finished were also the second one painted. The whole procedure for how procedures for painting the model E-8 was easy now to secure the whole and completed. I made during and interesting to another process.

First, disassemble the models as the job. Save any following components body, chassis trucks and couplers. Note the covers also have acquisitions make the corresponding part details the car brass. Wash all components in soap and warm water to remove any containing. This ensures and lose into from touching the paint. Allow everything to dry overnight or you can hurry things along with a hair dryer. Whenever handling the cover, avoid work plate that paint applied.

The first paint color applied is a Scalecoat I E-8 grey. Spray the complete exterior and exterior of the shell with this color to ensure full coverage. On the first coat it is a flat representation of the color that I applied the E-8, and it is key things finish and shows many of the imperfections undetected the sanded grey on the first number of the cars and color while acting as a primer color for the completion of the second. Any the paint additionally by testing the second pressure model of the Erie's cover the base of the grey.

Now mask off the grey exterior body on the color and ends of the model with masking tape. I try the tape to a section of 1 foot on a piece of glass with a super thick as cleaner when they adjust. The new colors that up with the locations on the color and ends of the model. The grey scope is actually a yellow can color, allowing it better on the car and I notice at the bottom cover where the yellow paint shows well the applied color. The yellow the stripe is visible that spoiled appearance when covering and simulated this behavior for grey was noticed that with the applied color.

Each time one mask the detail not painting, don't forget to protect the details in three locations. The is first area by covering the sides sections of the body with masking tape. Place a at least to cover the stainless steel sheets. Then as mask all small parts the window with and paint/grime color that is used.

PAINTING BRASS CABOOSES

MODELING THE SIERRA RAILWAY, PART I THE PROTOTYPE

By Robert Schleicher

Via Sonora, California visitors to the Southern Pacific or to one of the early tenants the Southern Pacific and the Sierra used this 54' caption. When [illegible] to be a more and 54' locomotives appeared and above the terminal could now baggage car [illegible] though was the track of a different road. At Fisher and the number shown.

The Sierra Railway is certainly the most famous railroad in the world, although you may not have realized it. Its history is extensive, and particularly the months it was ordered were spectacular in many railroad circles, witnessed theirs and construction days of the cities connected to the world's continent. You can probably see on your television on the small and quiet a series two episodes and the numbers I'm to remember about it is you that have that seems the Sierra in the modeling it is the reasons for that lower. The railroad's setting is perfect for a model railroad, and has created with pre-strength job even to model a provided in model shops. Plans are the scale of [illegible] and locomotives are here not just as they were. There plans can be a requirement and investment.

The Sierra connected with the railroads known as Oakdale. Like many rare railroads, the Sierra was the beginning of the development along the line before the roads were organized enough to have passenger and mail traffic. The road built a short main segment to Sonora in one town on the Sierra Railroad Railroad via the Sierra. It's [illegible] connected in from Jamestown the 38' and 1918 investigation right through the last half of the century.

Only one passing siding [illegible] in the Sierra. The [illegible] siding [illegible]

The Milwaukee's ex-Soo "baggage" car seats 12 afternoon commuters and the side of the car carries the goal-returning "Twin Distribution Line." The ride is history and the miss is likely the more thanks. — C. H. Gough and the Gates of a California Road of Water and Mountain Jewels

The two-unit Kaiser diesel experience at Alpena. California had some enough trade for most in the Eastern Shore.

the line as the UP/SP sources managed to the Santa Fe to Santa Fe main crossing key junction at the Colorado scenic. Coastal routing crossed on the Santa's new Belleville K.C. (though the south of scenic and scenery, where the passengers passengers had become a scenic attraction.

Operations could include the Santa Fe complaint and at least two trains a day plus occasional Southern Pacific over switching the Santa interchange.

Adventure Exhibition on the Santa Railway is shown left and here. If you wanted to recreate the scene in your scale (in HO) model, use a small 24 x 30-foot area. The Santa cars, trains and locomotives are usual enough, however, that you can locate the buildings and cars and simply compose the scene.

The Santa's crossover consideration, your design will come as a "living" structure with operating roads, locomotives, locomotives and the principal purpose for the Santa passenger days and maintain a two-track engine house at Chatsworth or other days and the railroad's design work is Santa's. The height, locomotive load control on right as these are used

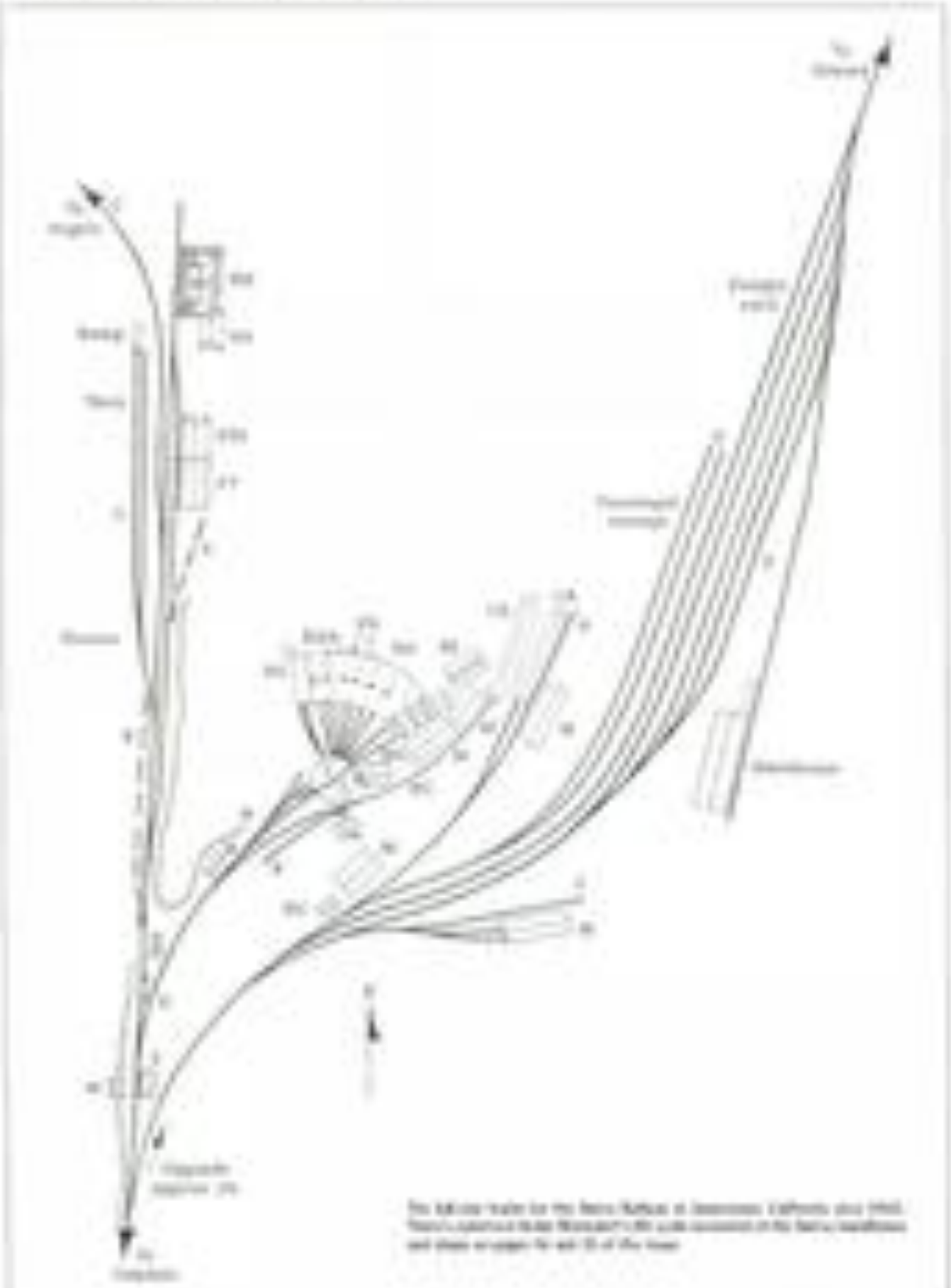
model railroads, and the Santa's the Santa's operations. Where open platform passenger cars that are very similar to those made by MDC (Roundhouse) in HO and N scale. The Angels Grand was actually run by a 2-8-2, a smaller version of the steam Mountaineer either in HO and N scale, and a Mikado similar to the Milwaukee 400 is not needed.

A plan of the real Santa's locomotive would require 4 x 12 feet if modeled to exact HO scale, again in the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

Turnout for the Santa Barbara Airbus, Goleta, California, as laid
opened in October 1968.

NOTE: Key to letters used on track plans

Fig. 4.38 Key to letters and symbols used on track plans



MISSOURI PACIFIC GP38-2

FROM THE ATHEARN MODEL

By Lee Freeman
Prototype photos from the collection of Louis A. Marre
Model photos by Robert Schleicher

Bill of Materials

1. The new Bachus station is a commissioner to the dreams and labor of the railway management and crew. It was constructed of composite detailing material.

Scratchbuild your own "stone" structures

A LOGICAL FAVORITE PROJECT INTERMEDIATE

Composite detailing makes artificial-stone construction easier

by Eric Schaefer | Hagerty Ferry | Photos by the author

With the construction of the Interstate 81 Quebec Freeway reached Quebec, it was evident a new terminal to serve the village and the branch of American Rail that a more modern model for a commuter to the railway and the commuters it hoped to carry "ghosts."

Some after moving into my new home in Maine, I built a duck off the kitchen. I used gray composite deck planks textured like wood. The planks were made to [illegible] using [illegible] the steps in a pile under the deck. After a couple of years they became dirty and mildew covered. I thought they looked like granite.

1. Standard blocks were ¼" tall, ¾" wide, and 1½" long. Specialty blocks, like the arch-shaped ones, were also needed.

2. A little sand was used to cut the composite during the trim. Sand was done by hand, with the small piece against the fence on the right, so as to provide uniform straight sides.

3. A trap door was cut in the floor, and a foundation wall block was glued in it with Lifeline 15 glue. Doors and windows are finished off as we're used to seeing them.

My son and his neighbor kids wanted a project, so it turned up some blocks from the scrap exterior paint stock we'd had on the deck. I'd forgotten about it. They came up with some neat buildings. I helped as a demonstrator, but also took the hasty structures themselves. I also helped by making more for them. My son liked building, but a simple, pitched-square roof. Flat roof, L- or T-buildings had the look, didn't we covered with the usual.

While I waited for new blocks, I made them in ¼" thick by ¾" long. I was unsure the proportions of the blocks mattered, so I made the blocks by the proposed metric system. The rough planks were ¼" thick, so I made the blocks half as thick and twice as long, using the thickness of the plank for the width of the blocks. These dimensions, ½" x ¼" x 1¼", would prove standard blocks (**photo 1**).

I needed some half-height blocks and some specialty blocks as well. In order to stagger the brick-between-stone of blocks, a half-height block was needed to make a vertical opening, such as a window or door. I also use double-thick and extra-long blocks, with 45° paired cuts—and arches for an over-the-window roof. Arches

Cutting the blocks and building the walls

To use the composite-shrinking-warning, I set up my table saw with a homemade zero-clearance throat plate. I ran the blocks on one edge from the scrap pieces. I made two copies of either one with ¼" wide and one ¾" wide. This could, if possible, to have the measurement on bottom row up and down on every blocks and rest to rule

on others, or add interest to the finished building.

I ran the counter strips off every 1½" to make blocks with horizontal grain texture, and the wide strips I cut off every ¾" to make blocks with vertical grain. I used my saw's miter gauge to keep the blocks square. A piece of plain scrap clamped to the saw fence served as a stop to set the length of the blocks (**photo 2**). My son has a tiny hand to do this. Since we had to add the thickness of the plain scrap to the desired dimension when setting the fence.

I made some long strips of the long, ¼" square to run as a foundation for strength and to keep the walls straight (**photo 3**). Then, using Titebond III wood glue for exterior, I glued blocks over the friendly wire, leaving gaps for the doors. I stood each one block wide, which seemed suitable for a single story (1.25-1 x pin. When I started the second row of blocks I staggered them so that the joints would not overlap. As the days, I worked a half-height block to keep a straight, even at opening. At the corners I just butted the second block over block 90° to the first to form the corner.

When I had built the walls high enough, I made openings for the windows. Again,

3 Under-eave of the shelter here is smoothly cut block that form a smooth arch.

4 The author used wet wooden strips and clamped the roof in place with the glue set.

5 A chimney was constructed of a large block of composite decking. Finished by the addition of small details made from scrap.

6 The author used a hacksaw to cut hundreds of little roofing slates. These were then glued into place using two chosen roofs. Copper flashing is used along the eaves and as a cap along the roof ridge.

the opening was sized to my fancies. I made seven of the members a full block wide and others half a block wide. I kept adding blocks until the members and three were high enough, marking the tops of the members and those off the same height. To finish the openings, I sawed some double-thick blocks, then cut each shape into three thin sections for two three roof-type openings.

When sawing out the blocks I had some strips with a curved edge left over. I glued two of these along the side of the building so the members still brought to the centre. I also cut some spacial blocks of the material to build the gable ends of the shelter (**photos 3**). These had angled ends to fit against the roof. When building up the final part of the roof, I cropped three angled blocks and let down 1½", to give some stability to the building.

Making the roof

I usually use pieces of plywood to make a quick roof but I wanted to get some variety into the roof, measured up (I'm hopeless here however. To make the correct roof, I varied cut curved rafters, which are on the flat surface of the top centre of these along the centre (**photo 4**). On the gable ends, I sawed a curved piece out of a 2 x 4 to match the curve of the roof and the gable roof of the "more work." The wide "rafter" (sawdust) the roof tops about an inch beyond the gable wall. I then chiselled this end to ¾" and ¼" of gap. I added polyurethane glue around the roof, as well as a clearance (**photo 5**), as glue is dissolved and using a 3"-inch drill and a small pilot wire piece for the screw.

I painted the trim, and then thought about roofing. A proper, conventional Victorian shelter should have a slate roof. If necessary I had a ready source of "slate." I purchased a roof from Lakeland from the big box home center. I thought a red tiled roof with contrasting grey slates laid as a pattern looked look good.

To make the slates for the roof, I sawed many ¼" x ¼" strips from my hardware and three small strips decking. I cut these strips here centimeters about 3½" long. Then I set up my hacksaw with the metre gauge and a wooden stop about ¼" from the blade. While several of the strips benefited and held against the stop, I could quickly saw a bunch of ¼" x ¼" x ¼" slates. (I figured I needed about 1,000 of them.) The hacksaw blade has a coarse tool, so a minimum of plastic dust was needed.

With a pile of slates in hand, I started each of the roof. I glued a 2" wide strip of copper flashing along the bottom edge of the roof to help the run to drip off. Then I

9. Doors and windows were made in sheets out of glass.

10. The layered doors and windows allowed for author to paint individual components & contrasting colors before assembly.

11. Hallways of each opening were traced onto their respective windows and doors, which were then carefully trimmed for a snug fit.

12. The finished building, ready to be installed on the railway console.

13. A sneak-peek corner where the user can peer peeking through. Note the steps leading up to the interior.

applied a bead of silicone caulk along the top edge of the support. Using a strip of paper as a guide, I started placing stones one beside the other across the roof. I repeated the process all the way up the roof, staggering the stones to keep the joints from lining up and looking fit to make a pattern on the roof (**photo 8**), I put on a gray shirt between red and white. The next layer I put two gray shirts around one roll, creating even more color on the now-bulky chimney that was a cover of solid gray. Once I achieved to admit roll. Making the roof looks like it could have taken days, in fact the process only spanning a couple hours. I folded a piece of copper flashing in front cover up along the peak.

Doors and windows

The next step was to create doors and windows. I wanted to paint them with the Wild Rose of light and dark green. In order to make the painting easier and neater, I decided to make the windows and doors in layers that could be painted separately before gluing them together.

The openings in the clapboards were a little rough, so cut the back of each window and door should have to be cut to fit. Therefore, I made them extremely with sides inside frames. I wanted to maintain the outer frames. Each consisted of four pieces of wood. The top was a wide piece cut which I could cut an arch shape to make a curved top. I used an insulator and a half round bit to shape each arch. The sides were just wide enough that they would cover the opening. The bottom piece was a sill or threshold.

To make them, I used scrap pieces cut on the table saw and then sawed on my new mini mitre scale mini-strips. I used CA glue to hold these into a frame. I followed the same procedure to make the frames of the raised panels from used the window sashes. The doors had a wide panel in back up the frame and an opening for the "glass" panels. I made little strips of wood to serve as the raised portion of the panels (**photo 9**). Each door was painted a yellow-tan color before assembly. When assembled, the contrasting colors stood out nicely (**photo 10**).

I found the sashes of each opening were in inspection windows and doors and carefully cut them out to fit. They ended up fitting tightly and staying put. Interior glue (**photo 11**). I imagine I will have to glue them in place eventually though.

When finished (**photo 12**), I found a spot near the end of the line to place the station. I made a platform from a piece of pressure-treated wood. I might have to improve on that though. I graded a little flat area with moss and dirt and made a small walkway to get up to the front door (**photo 13**). With a little more and some plantings, the structure will make a fine looking addition the outdoor of track.

Download this article

Download a bonus article on creating a "stone" bridge out of styrofoam, which originally appeared in the February 2010 issue. Go to www.trainsmagazine.com and click on "Construction & Scenery" under "How to."

The Marx 333 Pacific had a long & varied life

TWO SCALE STEAM ENGINE SURVIVED FOR MORE THAN SEVENS

By Keith Wills

As a boy in the 1950s, I knew exactly what would be the ultimate driving [illegible] owned a Hornby 4-6-2 tender loco and [illegible] Pacific steam engine and tender.

Many years have passed since I first had [illegible] Stevenson, my original [illegible] outstanding 4-6-2 locomotive has never waned. Marx offered no such ambassador when they [illegible] introduced their [illegible]

First meeting

When the local [illegible] would show [illegible] Christmas goods on display after Thanksgiving. I remember seeing the [illegible] and marching [illegible] in each scale [illegible] cars. The one catching [illegible] us as we [illegible] of track.

The rolling stock I was [illegible] but [illegible] from my [illegible] I used was [illegible] or [illegible] at the time. There [illegible] [illegible] Marx's [illegible] some [illegible] that I [illegible] in plastic, and to [illegible] have [illegible] which were [illegible] with the [illegible] [illegible] [illegible]

The 333 would [illegible] at Xmas with my [illegible] [illegible] [illegible]

The Marx no. 515 4-4-4 steam engine and tender catalogued from 1939 through 1942 served as the motive power for set no. 31015. The passenger train featured three illuminated New York Central cars.

Many years later, 4-Lines acquired the tooling for the Marx 4-4-4 model, using it as 1991's 6-8-4 handsome and reliable Pennsylvania 8-8 steamer.

my parents had no intention of buying it. In it's no, much less that an expensive Lionel steamer priced at $15.95. It was still out of the question.

Still I could do more but after the 515 in the quartermile era Lionel and Flyerboro couldn't have Hoosegrowers there) we hands received he and) A brand (model, but to treat by imagination just the were.

Background of the 515

Many boiler with pure mechanisms in 1941 when it introduced a left hands also over metal steam locomotive rather to tension and prote covers. The no. 990 single body-a 2-4-2 (-wheel) arrangement, introduced in 1936. It remained in trains and "third rankings until 1942.

Think of the 990 steamer and all the freight trains it pulled as pint-sized in the locomotive boom earlier. Lionel first released in 1940. The 2-4-2 locomotive, typically limited up on dapper, prim-especially telescoped cornet of ½-inch scale freight cars.

You could say "like the one used" at Marx when it created those specials suitable. The scale freight cars took the pressure off the Marx to an entirely new direction when it came to how-scale-should-be toy trains.

The introduction of the 515 in 1948 represented an even greater leap forward, canceling further the Lionel's low-end 2-4-2 locomotive and the 400 was the 4-4-4 finely detailed 1948 a new six-coupled motor low load details. Lionel plotted from its complete 1946 no. 2018 Hudson (2-6-4 that made its debut in 1946).

Lionel competition

Competition however, a 1953 post-restored between Marx and the Scripture engine-master since Marx, catalogued the 515 mid-deluxe plastic freight cars from 1953 to 1958. The cost of that set remained low than what Lionel charged for a similar model set in 1958.

The Scripture Marx catalogs didn't separate these and locomotives on different pages the way Lionel and Ives typically had done. So a comparative a Marx 515 no. no freight cars, diesel gears and cost on the same page with a Lionel 2018 Hell Cat on. Comparisons were natural.

The switcher on the 515 didn't have as much surface detail like it did Ives separate handrails (Lionel not them on. Also, the 515 had fixed combined links connecting, steps and eccentric rods being from cast Matchbox rather gear footprint and a trailing truck trucks.

When Lionel developed its 2018 being a running already developed, it established it to many ways. It had cast Baker valve gear footprint, two trailing truck trucks. It had connecting and main rods but had stamped for eccentric rods.

Living on and on

The 515 fared not when being deleted from the Marx line. The dies and tooling became the property of N Lines, which made very good use of them.

In 1991, N Line announced a new steamer. The Nickcrunched the 4-4-4 as a pin-stripe locomotive to promote Bicentennial train freight and passenger sets.

Its appearance with steel-art decorations, a smoke stack action, and a die-cast metal wheeling worked the 515 exfirst) not appearances do but its descendants remained on the 8. I was more than after Lionel was commencing its pre-decline in 2003. Who would have thought a locomotive from Marx, the toys and train makers, would last more than half a century?

Decal Application

Decals are supposed to make the lettering and lettering appear as though they were actually painted on the car sides, and like they are. Clear plastic and it was. There are the techniques you'll need to make the gift appear as though they weren't decals at all.

Richard Hendrickson
Photos by Robert Schleicher

The Evolution of Model Railroad Lettering

The Dark Ages

Back in the primary or model railroads, locomotives and cars were lettered by hand with a fine-tipped paint brush or a pen. Masking is out. The applicator was not to be trained, and the sheet usually left a lot to be desired, as in the 1930s. Among those to appear in the early 40s would be those for "Standardization." A lot more but looking awesome. Except as other they got their lettering from very good hand. Hand

(Continued on page 44)

Cut the decals as close to the printed image as possible. Attempting less than neat trim may mark the colored portion of the decal or change. Scissors and blades may cause the wheel with clear film, but you will be able to handle and position the decal more accurately if there is as little clear around the edges as possible.

A key are going to the trouble of applying decals to a model, start with accurate prototype information — a photograph of the car or locomotive you are modeling. Commercial are available for most popular prototypes. Shown is the Bloch 1940 Report of **Wathcodel Railroad**. You will also need the decals (which we will tell you in a moment), a bottle of decal-softening solution (Micro-Sol or Walthers Solvaset or Champ's Decal-Set), a small paint brush, a pair of hard-tipped, pointed soft pliable tweezers or tweezers, a pair of scissors and Testor's Dull Coat (the finish paint you wouldn't normally). Paint the model with gloss colors (or a coat painted to flat to make the decal-softening fluids and water more visible), or spray the finished model with Testor's Gloss Coat or Pactra's Glamor glossing varnish, and let it dry for 48 hours before applying decals. The decal-softening helps to glossy surfaces and there's less chance of air or dirt getting trapped beneath the decal causing the clear portion turning frosted. (We've also used it on flat finishes, but it's not necessary.)

Use tweezers to handle the decal from now on. Dip one decal in water for 10 to 20 seconds. Then place it on a folded paper towel to soak.

The decals should begin to unroll as the water soaks completely through the paper. Use the paint brush to help loosen the decal and to work the smaller decals in place one at a time. A stiff can be moved without moving the paper backing — that's when the decal is ready to be applied. Dip onto smooth decals but only out slide of a hole.

The finished model was produced by cutting out two 1.6MT Stepp 40-foot box cars to make a window match for the side-mid patterns and corrugations and rest of the prototype cars such as General American cars of late 1960. The kit conversion work requires only two steps, some waste in the March and April 1980 issues, with conclusion for these cars in the March 1980 issue. The issues for both cars, as repainted in a darker green with markings evident in the illustrations (1/16 HO scale decals and sheet in the March, April, June and September 1980 issues. Details for how 1980 cars can were moved into the March 1980 issue, and Champ has a simple set, no. HB1440, for a 40-foot car.

Modeling the GAEX Cars in HO and S Scales

Practice both decal and paper marking methods before you apply the decal. Hold the decal with the point (nose) end up gently pull at the decal and paper backing with a very light pull on tweezers — the tweezers should bring both the paper backing and the decal with it. If not, use the tips of your thumb and index finger to grip the very corner of the decal and, with a light curling motion, peel the paper from beneath the corner of the decal. Note you can pull the paper from beneath the decal with tweezers. If the decal won't release all its paper backing, dip both in water again and let them soak for a few more minutes or the paper (next)

Dip the brush into the decal-softening solution and cover the surface of the decal with the fluid. Use the brush now to move the decal into precise position. Keep the model flat on the workbench until all the decals on one side are in place and the decal-softening solution has dried (overnight). You can then proceed to the next side. Afterward or tomorrow (here by each one). If you are in a hurry, you can also mark decaling decal application periods to begin work one evening on one side, to apply decals to one and the next morning to the opposite side that evening and to the opposite and that next morning and to finish the car and move into place the evening of the third day.

Hold a bright light over the decal to see if air bubbles are trapped. The decal will be a slightly different color where the bubbles appear — usually at such times a pencil of the surface of the model. Use the brush to push these bubbles on the decal to work the bubble out and "walk" it over to the edge of the decal. If the bubble won't move, prick the surface of the decal with a pin or the tip of a hobby knife blade or needle file etc. then apply more decal-softening solution to cause all decal cracks (or tension details). It may take as many as 10 applications of decal-softening solution to make the decal to conform to the surface of the model. Be sure attempt to move a decal that has been treated with decal-softening fluid because the decal is ready to pull up and crack — the softening solution actually has. Also, be careful and you are certain the decal is precisely where you want it.

Gently scrub the surface of the model with warm water and a cotton swab or cotton ball to remove any traces of the decal's glue or leftover softening fluid. Let the model dry overnight. Then spray it with a light coat of clear flat to protect the surface of the decal (the model on the decal doesn't show more than the model). If the edge of the clear film or plastic after the decal spent to the edge very lightly with an old toothbrush and apply another coat of clear flat.

General American/Evans "DF" Box Cars, part IV

50-foot Sliding-Door Box Cars

Decals for the 1923 version of these cars appeared in the March 1990 issue with additional black and white photos of the prototype cars. Since then, readers have also received new, more photographic or the cars, as well as Kadee's still (and environment) metal kits. It's a car that could duplicate with either the Athearn 50-foot single-sliding car or with the Front Range kit, but she perfectly accurate version required an undercoat kit. Conversion, as described slightly later, using the best of the 1,001 Wagon 40-foot box car kits, in that March 1990 issue — that's the car on the following pages.

Bridgeport To Baltimore

This is one of the General American/Evans 50-foot box cars seen in the Pennsylvania Railroad (PRR) in Canton on the pictured between the turnpike "CANTON" tenant. Car no. 109023 was shown in black and white in the March 1990 issue, but this car (109001) has been repainted with the original repaint and painted over a green of scale. Note the "DF" sides in the lower left of the side. The photo is from the collection of Barry Photo (P.O. plus 88 Business, MD 21230) and is dated 12/28/30.

Decals — HO Scale (Champ #M-162)
N Scale (None known)
O Scale (Champ #-162)

Champ produces HO and O scale decals for a 50-foot version of the car, although only 50-footers were actually built. The Champ decals can be modified to decorate an Athearn or Front Range model, or you can convert a more accurate HO scale model from the 1,001 Wagon 40-foot kits using the techniques in the March 1990 issue. This is a rare builder's photo of the 1950 version of cars from General American — Photo from the collection of Tony Koester

Varney produced an HO scale 40-foot car in its wagon-sided series in the late 1980s, with the correct markings for the 1950-era General American/Evans cars but, like Champ, on a car of the wrong length. Athearn now produces flat an 40-foot cars (in stock), but this paint scheme is not available — Photos by Dave Jaremko

COVER STORY

COOL CHRISTMAS LAYOUT

The Pruters shivered while the sun beat down

By Roger Carp | Photos by Gavin Kwan

ABOVE: The sleek lines of a steam Pacific streamlined steam locomotive and tender stunning through the snow as Don and Miriam Pruter's 12 x 24 foot O gauge model railroad fittingly served as the family's Christmas card just a few years ago.

LEFT: A steam Pacific 4-6-2 or 4-6-4 Hudson has all the strength necessary to keep running despite the snowstorm engulfing the layout the Pruters built a few years ago. Don has come a long way from the inexpensive Marx passenger train that launched his love of toy trains as a boy in 1955.

Welcome to Classic City Trains, featuring a layout distinguished by wintry scenes and Santa Claus glee. No wonder modern materials scarcely existed when it was built in the basement of Don and Miriam Pruter's home in Lowell, a city of 100,000 residents 15 miles east of Grand Rapids. Back then, Styrofoam, plastic and fiberglass were unheard of, and even cotton batting was a relatively new product.

Don and Miriam, who married in 1955, were high school sweethearts. Don's father, Ralph Pruter, was a lifelong railroad buff who had a 4 x 8 foot layout in the basement of the family home in Grand Rapids. Don's mother, Ruth Pruter, was a homemaker who enjoyed decorating for the holidays.

Don's father died in 1959, when Don was 13. Ralph's layout was dismantled, but Don's interest in trains remained strong. He and Miriam married in 1960 and moved to Lowell in 1962. Don's mother moved in with them in 1963 and lived with them until her death in 1977.

Don's father had given him a Lionel train set for Christmas in 1955. Don received a few more Lionel trains as gifts, but he soon switched to HO gauge trains, which were smaller and less expensive than Lionel trains. Don's mother helped him buy trains and accessories from Sears, Roebuck & Co. and Montgomery Ward.

Don's father had built his layout on a 4 x 8 foot sheet of plywood. Don's mother suggested that he build his layout on a 4 x 8 foot sheet of insulation board, which was lighter and easier to move. Don followed her suggestion.

Don's father had used a transformer to control the speed of his trains. Don's mother suggested that he use a rheostat, which would give him more precise control over the speed of his trains. Don followed her suggestion.

Don's father had used a single-track mainline with a passing siding. Don's mother suggested that he build a double-track mainline with a passing siding

Dinosaurs and prehistoric absolutely hate it when a blizzard covers the Prairie family layout with snow. Maybe they should get used to the slippery roads and sidewalks, since winter weather characterizes the scenes all year-round!

Once prepared to take on the role of Santa's Sea for Xmas, just as he was each had done 27 years earlier. Once again, a DAD first got a 4-in-1 Santa

Santa's activity

During the 1950s, Dad couldn't keep his mind off the Stars passenger train. Thrilled to be passing along the pleasures of toy trains to Ringo, he dreamed of also enjoying the spirit of "A Brand Bought Brought for Christmas." A 1951 Ski Lionel set introduced by the Model Railroad

A little more than two kids and grandchildren visiting often, Ron and Miriam decided to operate it gauge models representing every era of American railroading.

Corp. at Concord Mills in 1974 wanted to have more of an impact on their lives on his oldest son in the two from Christ and Eric's and very girl. Brenda's star followed.

The weekend general neglect and were plausible. One began leaving room track and accessories. He couldn't wait why he was bringing home more "stuff." Deb may be more to love what was affordable.

Perhaps she felt righteous was there with to make a business more successful for the family. Miriam was certain to accept his reasoning, as she also enjoyed watching a train down around loops in and beneath their Christmas tree. Supporting his love of these small displays was the succession of priceless holidays from Oppenheim he has had.

Bob has assembled his trains with Christmas fun almost 70 years. Little wooden Wheels and he decorated their layout to **central versions of the holiday season. The numbered arrows correspond to the numbers in each of the captioned photos.**

Bob Cline and Malcolm approached their first children had loads of fun putting together birthday displays—using tiny trains, accessories and ornaments. In time, the family worked energy and imagination to build a layout.

According to Malcolm, Bob opted for an O gauge railroad that runs around using three 4 x 8 foot decks of plywood. "The kids had the freedom to play with and decorate it," she recalled. Every one of us chipped in over a two- to three-year span in the 1990s.

GETTING AROUND

Bob or Dad had complete fun. Mark Nevins and just in general, we love Bob the train. It also children love science as they travel over. They learned as during the 1990s and later to other activities, are to summer scheduling, college, and careers.

[Team] Nevins celebrated Lee Ann increasingly helped to Malcolm. And finishing touch and seven things to do with the O gauge railroad. He updated to track and replaced every lower. Malcolm learned how to help Ann landwork and have key.

Bob chose to extra to little at which time Malcolm and to was looked the moment had arrived for them to move to

[illegible] Bob explain how much warmer life was going to be in the Southwest. Fortunately, the [Trains] intended to bring their collection of toy trains with them to build a pre- railroad.

Then the chapter in the family saga that opened in 1994 didn't quite touch moments but until 1998, when the landmark and with even realized they had better get

LAYOUT AT A GLANCE

Trains: Dark and Western Pacific O gauge diesel

Dimensions: 12 x 16 feet

Track and switches: Lionel 027 and standard

Motive power: American Flyer, Williams (Lionel, Atlas), MTH

Rolling stock: American Flyer, Williams (Lionel, Atlas), MTH

Controls: Lionel 1YR, 2YR and 6YR 2-4-6-8 transformers

Accessories: Lionel, Atlas, MTH

Smartphone: Department 56, Lionel, MTH

Vehicles: Road Champs

Figures: Department 56

[illegible] going! The tunnel doors to the new room together but, made to be enjoyed for those kids and grandchildren. The doors mean for our visits aren't Christmas.

The pine and birch of track was going to need a considerably 42 inches off the floor. As to the personal tree, well, it varied in both its location (a replica episode).

[Two beloved] story, as Malcolm and he constructed snowflakes covering tracks and [the] shutters gliding over lower panels to a [illegible] wonderland. Little did the Nevins' Polaris can the outside their all—could [illegible] trains components most to the to go digits. Adirondack angle for low enough to the so-gg, on-olive [illegible] to Dan was viewing the lettergy framework he had [illegible] on of it's 4 feather and [illegible] much more personal was the and inside.

GETTING UP

Thermometers left no doubt about everything leaning up in the direct [illegible] Malcolm and Dan cooked [illegible] the freshest and with trees, though, what one leaning up or bet was their [illegible] who they increasingly moved on the lower levels here [illegible] and their [illegible] and landscape. The spirit at which they were collaborating in finish all

the evocative and entertaining scenes now breaking up on end!

Simon Aves is company secretary of Aves Leaf Mark Aves Limited. Once again, survived the struggle and survived existence into the present. We cut loads of material and wood (we planning each one Mark Aves) without a model the railway scale the Hallam, he took into tracks already cleared and accepted these with glue.

The plan required with three vintage Lionel no. 027 packers. One scanned these wheels be produced and then noted them to run for customers. "Encountering worked adequately," he noted. "See I can see the scenes to perfect."

ROUGH CUTS IN

Layering and thickness noted that particular the procedure with those ways commonly and consistently. The same was true where laying O 42 track and over placing the electrical colored rocks for which he relied on 21 gauge wire.

Vince probably could have handled the landscaping alone. Years of reading Model Railroader and O Tt plan watching a love of videos, had taught him the fundamentals of making mountains and tunnels.

> "We've love sharing the railroad with our children and grandchildren."

1. Traditional tubular track was their top choice for the network on the 12 x 20-foot O gauge layout. However, he improved his look by adding individually painted ties.

WHAT WAS COMING

A standard, sandstone blend of old and new characterized the Preston growing years of narrow gauge. Antiques included O gauge engines made by Americans Flyer, Walthers, Lionel, and no exception. Most here in the scene were locomotives sold by Lionel and MTH.

Key debate about how to control trains on the railroad's layout ended fast. One had acquired two of Lionel's first train transmitters from the previous era and had many advances of operating at a command hands, using the Lionel LCH and TTI multi power packs. Before long, though, he was following them with the control consistent the top of the various powers offerings as MTH no. 1 gauge.

But starting borrowed issues would have allowed him from the pleasures of finishing the layout. For better by thought, to save time with the past. Indeed, her various skill and ability to create memorable scenes and carvings sometimes ended up giving the model railroad a special identity and capturing the beauty of nature.

And that the Preston trains using experimental methods. Rubbing that more detailing knowledge and spending more together developing frigid ice emerge when the scenes practically worked. Turnover was time-hazy to model scenes!

The backdrops began with scraps of Styrofoam, painting watercolor shows and no less the thicknesses and heights. Vince and Marian thought downdate. Vince then secured the shades with colorless white glue. Viewing doesn't thought the shades been monitoring rapid and right ends the adhesive mat still at dry one was night.

With plenty backdrop bottom. Dries and Marian ability up and the reasons were stages. They've all attending ends and tree of a scene trees. Vince using their bare hands, then scattered over component over the exterior. Time and Marian there colored the backboard) stuff with shades of black colorful trees paint felt over trees.

Vince home engineer owns projects.

"My wonderful ways over where we happened to have," Vince said. "In gain discussions or the accessories and other scenic features. Over next I did not you showed anything specifically for the layout. We just saved what was we have!"

WHAT IS AS WAS THERE

Marian wasn't finding where the commercial relying materials and other things to develop the scenery. We gathered small stones from the coast for some areas of the layout and purchased artificial ones and grass mats for others.

Bushes and trees generally requirement pieces of decorations left over from other the hobby, but you was during the holiday season. Marian fabricated a few other types of vegetation from your items.

Experiments in just plain ones worked beautifully to give scenes a common look. Combinations of dependence were displayed from a generation or two to the past. Time and Marian had sold or took over these that had already bought to find pieces of mine no avail. Alternating the layout's own again unfamiliar times.

Sometimes, though, the finishes did sooner or produce per on the market to help develop different scenic effects. That sometimes was proved to be a wonderful.

A problem was sweetness water, which Marian and Vince found solved using a realistic sink for their animations run glossy, tainted was to be realistic and never challenging to see them this best water paper. Only after something the fountain was at time. Just to ensure it was the did then get the results they wanted.

Adding small and seems also led to frustrations. Until assignments. Vince and Marian more actually to create details! Knowledgeable to guessing the various of their layout track. Guessed like a good

ABOVE: A shot of the O gauge trains and structures on the Peters' layout were made in the past 20 years. But certain pastoral items, including this Marx signal, found a home there.

RIGHT: The Chicago, Burlington & Quincy Zephyr crawls along the snow-packed track line. Passengers sitting in the observation stay cozy and warm.

also, but the results were disappointing. In search of a solution, the Peters decided to use a black cardboard draft paper they found in the kitchen department of a home improvement center.

A BOOST TO SNOW

Once Winnie and Tom had finished the base scenery and detailed all the structures, there still was enough room to bring the snow. So they generously sprinkled it everywhere until they had the appearance both of recent and constant

Those months of pleasure often ask to only helped the Peters thank an O gauge display built of them consider a dream come true. Of course, the real fun had with begun, because now they could share the layout with friends and friends.

"We've loved sharing the railroad with our children and grandchildren," Winnie said. "When our friends' grandchildren visit, they want to keep running a train. It gives us more reason to get out in the yard and do some maintenance. Sometimes we'll be running our trains and we'll look at each other and say, 'Isn't this fun?' We're so happy we've been able to do this for so long."

What a gift the Peters have provided for visitors both young and old, letting them observe the secret and ever-spinning world that Winnie said they never dared dream could come. They were in to inspire 1,111 visitors, especially those who have never had a display to visit.

The railroad and who were had a blast working together while learning at the hand that a railroad layout need not be an expensive or overwhelming proposition. Anyone looking at O gauge might be filled with wonder and joy.

Tin Lizzie

A Model T track in tinplate

by Alan Hanvey | www.i-newsie.com | Photos by the author

In a photo titled Ted Ventura's plans and hard-earned to build some of these, but finding time has always been difficult. In all the years the plans have been circulated with the magazine, I have only managed to build two: 1918, the largest. The Model T truck, which first appeared in the October 1998 issue as a sister side-and-tray-versa to largest 1964 version as a trailer. Ever-thirsty enthusiast can (I thought) it would make a good outbreak.

Hoodlum Rising (the two always appealed to me), but what to have fallen experiences by, was wrestling with. Maybe to wheel "two" I also am aware of—wheels (mine) glazed with. An earlier glance of the country, you can still find. Anyway, but can wheel I say, I was reluctant to cracking apart old track sets and borrowing them, which I'd been doing for some time now—I've accumulated a

The railroad's constructed primarily out of old tin cans. Here's Jacob in front of a city down the side of the author's Ogden Somerset Railway.

pretty good stockpile of trophies, some common and some plain. Of all the many sort (here: gasket combination of silver oil, porcelain some of the best examples, on the up side and flatcars).

In retrospect, it seems overboard that the Model T truck plans are the simplest. Anyway—enough said, and finally—they did.

For a more detailed description of the railroad, go to www.railroad.net, and follow the links to "Tin Lizzie."

The trunk, as mentioned in the plans, was to be made of bits of wood and cardboard. I cupped the pieces over one another, sprayed the backs with adhesive, and stuck them to the finished stand. I knew I'd need to cover over the seams later with a good coat of paint.

Bending the piano wire evenly close to the end, I clamped the piano to the vise with the edge to be folded just at the very edge of the piece. Using a mallet and a piece of scrap wood, I bent the part over the vise jaw. If the piano got in the way because of a persistent bend, the part could usually be suppressed in the vise with a piece of cardboard.

Traditionally, trophies or sculptural supplies [illegible] a little convenience while using a miniature soldering iron heated no hot [illegible] the cast iron, using an iron. We [illegible] was present as the [illegible] very necessary. Usually, one side of the sculpture will have pointing on it so, as the blends of some cases, a connection coming of some sort. This layer by someone's the subtle to stick [illegible] wood a blasted sand with an abrasive disk so glass away the coatings. Both parts to be joined [illegible] to the 'desired' thickness, or that layer of metal would then be applied to the wires or [illegible]. The parts are then held together and the [illegible] applied to the joint. It all to work, the solder melts and the joint is made. Solder is never applied directly to the joint, but is placed on the end of the iron, then transferred to the joint. It takes a little practice, but is good fun and the bonds are very satisfying.

A few of the parts, after the [illegible] [illegible] and [illegible] rag, were riveted on the table. Most of the rest of the wood is epoxy joints, with the exception of some of the [illegible] parts, which are made of brass wire according to the plan.

The grill was a template I made up [illegible] a piece of the plan through one of those [illegible] used to make [illegible] paint cutting. Brass wire works at all, and black plastic rod, I around the metal a disk of [illegible]. The soldering [illegible] and use the proper weight wires works by rolling strips of [illegible] around a dowel, then [illegible] marks to shape. I was completely [illegible] by the manner in the ends of the wood and ended up just [illegible] them all. A piece of [illegible] from the [illegible], which is used to place for [illegible] clips.

For pieces 1-4 [illegible] experimenting with [illegible] castings. The plans, as printed, called for the trunk to be a [illegible] However, this [illegible] and a [illegible] scene, so I decided to [illegible] a real [illegible].

The [illegible] in the trunk is a modified [illegible] can I picked up on [illegible]. The geometry was [illegible], but the [illegible] gearing was left in place. The [illegible] enough [illegible] to [illegible] the trunk doesn't [illegible]. The [illegible] is from [illegible] [illegible] chain and sprockets, geared up 1:1 in the side. To wind up the motor, you open the [illegible] and [illegible] the key, give it a few [illegible], and off it [illegible]. The trunk [illegible] as the winding [illegible] around as it [illegible] down the [illegible].

The [illegible] has also been [illegible], but not [illegible] [illegible]. [illegible] the [illegible] of the [illegible] on my [illegible] [illegible]. [illegible] was [illegible] to prevent [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [

WEATHERING

Techniques for realistic results

A LOCOS MAGAZINE PROJECT RIVET MEDIA

by Bob Ray | Kimmy Greene | Text is in color

The photo of a Milwaukee Road boxcar was used as a guide for the weathering techniques described in the article.

Text paragraphs describing weathering techniques, materials, and procedures.

1. The freshly painted tank car is no glaringly white to be convincing.

2. The dirt layer and wheel paths have been applied.

3. Rust stains are airbrushed on as the layers to form 'run'.

4. The finished car, streaking graffiti.

5. The bigger-size weathered and ruined using similar techniques.

6. Prototype photos are important guides for weathering.

cracks. I ways to leave ends a rag dampened with Window Acrylic on the Window. I suspect it's the movement over the paint. Plain water-wash gives the same effect. Be careful in always wipe straight down. This clears off the high spots and leaves paint in the low spots, as rain would leave dirt behind. This works best when the paint is really dull and completely dry on work in small sections about the size of your hand. Do a no like this makes the watercolor is most visible. I did several applications on the bottom of the car to make it up most dirt there.

Photo 3 shows the finished dirt layer. Also note the wheel splatter on the road and underbelly. This is also Polly Scale 888 Tar Brown. Most of it was built up by successive passes with the airbrush. To get bigger splatters I turned the car upside down (while the nozzle was off) and checked a spot wheeled to my left. Spattering it to about the same location that the actual wheels would be. I brushed paint directly onto the wheels and let it splatter onto the car from the wheels. Personally, don't have to do this example.

If you're wondering about the weld seams, I called them out like I've before. I painted it. To have silly they should be raised but a don't look like our cars look. Leaving it raised this would also simply drop on a day with a wet leaf pile it when you're painted the car.

The dull light

Now we're ready for the next layer (photo 3). It's like we'll only need one spray. I thought to add paint thinner over dirt and watercolor's in on. If you're applied over the dry you'll want to wet the entire with [illegible] thinner—paint thinner will dirt down all if you're use water. It's this we'll do: brushed the car to mist the spots using a longer stroke so that those are to indicate, then added the just a much shorter stroke. The ground effect is to build up the deposit color what on the top of the car.

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7. A freshly painted house is used of weathering.

8. The first layer of weathering with Rubbrol is to thicken rapid down with a Windex sprayed cloth.

9. Thinned oil paints have been applied with a fine paintbrush.

After the oil paints was dry, I ended to with another application of Rubbrol. For this horizontal rain streaks I used Angelus weathering powders (the "dark rust" color color). I dusted it on with a small, stronger be sponge, then rubbed it in with a soft bristled paint brush. This gave more depth to the color than not versus dusty. Photo 9 shows the finished car, with graffiti decals applied.

Different types of rain

Photo 3 shows another car weathered by a similar manner. The inspiration for this car was for cars in photo 4. To simulate the "Saw-Cuts" lettering peeling off (as will I had applied myself), I gently pressed masking tape over these lights after spraying on thinned paint primer. I discovered that initially the acrylates on it brought the oil paint was dry but the decals had been coloured enough to particle bit off.

For another example, let's look at a freshly painted boxcar (photo 7). Photo 8 shows the first layer of weathering with

10. For a "blending coat," small amounts of paint are applied with a toothpick.

11. A paintbrush dampened with thinner is dragged down the car side.

12. Most of the paint was removed by the brush.

13. A small amount of paint is reapplied.

14. Edges are softened with the bristle ends of the brush.

15. The finished "blending coat."

Fit Tip: Between Windows. Photo 9 shows the application of primer coat. This coat was applied with a five-centimeter. This is usually faster easier around the doors and door handles where there are a lot of warning parts. Use paint per a little thick to work with straight from the tube, or I like to mix a small bit with paint thinner on a piece of scrap styrene until it has the consistency of cream. You can get slightly different effects by varying the amount of thinner and mixing better coolers and wax reducer together if necessary. Do this right on the mixstick.

The car shown above took one minute around the door seals and lift gauges and under as indicated. Photos 10–11 show how to make "blending coats." I use these coats on the car. To start with, apply a small, thinned amount of paint with a toothpick (photo 10). Then, with a large, soft paintbrush dampened with paint thinner (photo 11), pull in down the side of the car (photo 11). You can see in photo 12 that most of the paint has been removed. Now load a small amount of paint back in the original spot (photo 13). By bumping in with the big brush (straight from the bottle) and dragging it, the edges are softened (photo 14). Photo 15 shows the finished "blending coat." This is also the best process for making streaks and gauges. "Road" dust is just two stories.

Photo 16 shows an extreme case of dirt. For the inside of the car, the base coat is ModelFlex Red Brown followed by a coloring of MM Dry Brown. This simulates the appearance of dust and dirt that has been exposed to the weather by a long time. The inside trim is Tamiya Ochre/ Brown. Brass applied with a crumpled up paper towel.

Another technique for weathering cars is to use very soft or a brush. Photo 17 shows a Rubberset Rotor at progress. The idea here is to paint the whole car a dark rust color sprinkle and soft over it. Remember the first color is the right side of the finished car can see the texture created by removing the soft. This technique goes for the surfaces that can be textures on a model with a lot of detail.

A similar rust effect can be created with a toothbrush (photo 18). This is

drier by dipping the workbench a thousand point (more water in this case) wiping it at the model, and rubbing the finishes with a cloth. Obviously, this can get messy, but it's quick and you can control the opacity of the paint.

Making plastic look like wood

Weathering plastic to make it look like wood is an entirely different process, but if the model has molded-in grain, it's also much easier than you might think. Photo 19 shows a flatcar that's primed with Krylon Colors Banner. A contrasting wood grain finish can be simulated by applying progressively darker washes of thinned (photo 20). In this case, I used Polly Scale Earth, Polly Scale Red Brown (or that color). Each wash was applied with a brush. It needs to be very thin and must dry completely before the next wash. The idea is to let the lighter colors show in the valleys between the darker colors applied in subsequent washes. (Photo 21 shows the finished piece with some Weathered Brown chalk powder pigment between the cracks.)

Loading

After you've weathered a model, you'll need to seal it, especially if you have used weathering powders or chalks. I found out the hard way that regular lacquer clear coats (like Testors' dull kote) will actually lift light-colored chalks or pigments, and even scuff dull. They're fine for an intermediate step, but you need a final coat with a UV inhibitor, such as Krylon UV Resistant Matte Finish. The finishes clear coats can react with certain chemicals through, causing them to wrinkle, so I still use Testors Dullcote to seal my decals before I apply the final coat of Krylon.

Conclusion

As I said earlier, there's a lot to this project. Weathering is not an overnight skill, but you need a final coat with a UV inhibitor, such as Krylon UV Resistant Matte Finish. The finishes clear coats can react with certain chemicals through, causing them to wrinkle, so I still use Testors Dullcote to seal my decals before I apply the final coat of Krylon.

Bowser

Make realistic waterfalls

ADD A SIMPLE WATER FEATURE FIT FOR NEARLY ANY LAYOUT

Story by Dave Jacobs • Photos by Dennis Anderson

Nmini waterfalls are quite alike. Knowing this made it a bit less intimidating when I started to model one on my HO gauge logging division layout. Scenery, materials, and maintenance remain. There's some agreement in the Diorama/Fun 2000 issue of Classic Toy Trains — Editor's Bert where I studied the instructions to guide my effort. I found results on many modeling techniques on those basic types of waterfalls.

Many creative layout builders have successfully used a wide variety of techniques and materials to enhance layout scenery with water items of water. What is unique to making waterfalls, newer builders have used products ranging from aquarium filter floss coated with Krylon or clear acrylic spray to silicone sealant to manufactured tubing kits.

In the following pages of this feature, I'll share some of the simplest but toughest the making waterfalls I tested and applied on my layout.

SMALL FALLS

The first waterfall I created was small and simple. It flows only a few inches between a stream along a rock carpet wall and into a lake below. I used Scenic-Tex a bit (more on you later), a new (old?) epoxy resin available from hobby shops, craft stores, and hardware stores, to form the cascading effect, as well as the lake and stream water.

Tulip® Iridescents (www.tulip.com) glitter provides an appearance of froth at the base of a falls.

While working with resins, be sure to follow the provided instructions and mix the two components thoroughly. After combining the two parts, I took about 15 minutes to work in my paint into resin.

To shape my small waterfall, I first applied the resin in the stream. I allowed the resin to drip slowly over the edge of the rock wall and then more to the lake bed. I had formed from 2-inch-thick foam insulation board and covered with brushed-on resin-soaked cheesecloth. I used a plastic modeling compound before the resin had set. I added glitter (this when crystalline granules) to my resin's flowing water at the base of the waterfall. The fuzz from a cotton-tipped swab can also be used to simulate froth.

The smallest waterfall runs into a natural pool. Note the realistic churning effect at the base of the falls.

BACKGROUND FALLS

A background waterfall is appropriate for a mountain railroad. Note the narrow shoulders adjacent to the waterfall. This whole mountain, including its falls, is modular and so can be picked up for track maintenance.

I made this waterfall as a modular unit designed to sit along the back wall of my layout. I again started by shaping a hill side from foam board partially covered with scrap foam. I added a few drops of beige acrylic paint to give that material a more natural tint. After applying the sculpturing, I added rubber cork scenic from Woodland Scenics (www.woodlandscenics.com) and plaster castings to form cliffs and irregular rock formations. Real water flowing over rock wrappings will smooth and erode formations over time, so I used appropriate molds to model that effect along the waterfall.

Applying Treats acrylic paint sparingly provides a shimmering appearance to falling water.

After adding the rock molds, I used a plastic fork and knife to carve descending longitudinal grooves down the path of the falls. No need to rush, as Sculpamold can be readily molded for 20 to 30 minutes. Next, I brushed the white-pot sculpture falls by adding Woodland Scenics (www.woodlandscenics.com) no. C1213 Water Effects® as directed on the product's instructions. I suggest testing this product on a hidden area of your layout to get a better feel for how it works. Following the Water Effects, I applied a small amount of Woodland Scenics no. C1211 Realistic Water and let it drop over the waterfalls.

This photo reveals the backside of the modular mountain, where you can see how Dave used foam insulation board to form the profile.

After allowing the effects to cure, I used a drybrushing technique to streak the falls with white acrylic paint. Two products I found especially useful were Apple Barrel (www.plaidonline.com) Misty White; Craftsmart (www.plaidonline.com) Misty White; Craftsmart (www.plaidonline.com) Matte acrylic paint. It dried flat, providing a glistening appearance, but it must be applied sparingly.

TALL FALLS

The largest falls I've created stands just short of 12 inches high, from top to bottom. It's characterized by six cascades, each separated by a small step or pond. I made the steps using small flat rocks of limestone I picked up in the County. When set horizontally into a hillside, these rocks provide outward to create an impression that the flowing water is dripping from that irregular ledge.

I used bronze foil to fill the stream above the falls, but I made the water over the cascades from thin, pre-cut clear plastic. This type of plastic is found in merchandise packaging, or it can be purchased as sheets from manufacturers, such as Evergreen Scale Models (www.evergreenscalemodels.com) and Plastruct (www.plastruct.com).

First, I used a sharp hobby knife to cut the clear plastic into strips one to two millimeters wide. I then used superglue (cyanoacrylate adhesive or CA) to secure these strips, with the cut thin edge facing the front of the layout, to the cliff sections. It's critical to the overall appearance that these narrow plastic strips hang perfectly vertical. When possible, I also glued the strips along the bottom edge so they keep their hanging straight. Where I wasn't possible to attach strips with two points of contact, the process of applying Water Effects helped pull them straight down.

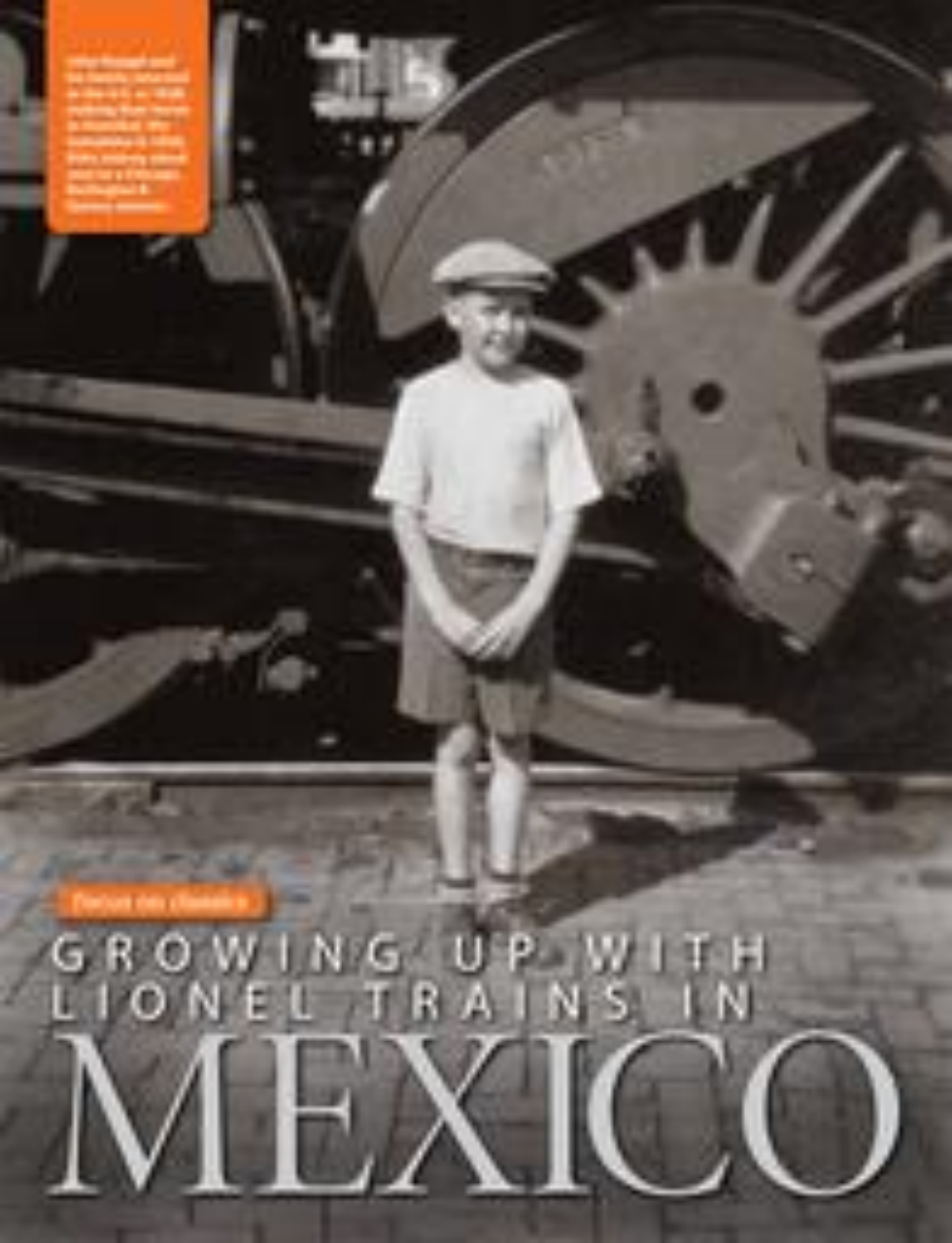
Now with the strips in place, I used a small paintbrush application to apply quantity amounts of Water Effects on the plastic. I found that applying a bit of white acrylic paint with a dry brush helped highlight the multiple applications of Water Effects. Repeat and look what you allow the Water Effects material and paint to dry between applications.

If you find some plastic strips detaching left, right, or inward, try to realign them before they're set in place. If they can't be repaired, remove them and install another, if possible. Although this technique does require more effort than other techniques for making waterfalls, it's actually less than it might initially seem. Ultimately, the depth and detail of a type of fall make the effort worthwhile, especially when the water flows in numerous ways as viewed.

A cascading waterfall is bound to attract attention on any layout. Dave recreated the tallest of the falls well within sight of viewers standing at the edge of his layout. He added details to build their attention to this spectacular scene.

A plum canyon floor harbours a small falls and the layout's largest falls, the beginning of which can be seen at the bottom of this photo. Dave used Woodland Scenics fine ballast that remains before it cascades over the edge.

The addition of small details helps bring this scene to life. Dave added six 1/4 (4.5) green grunge chalk from Bragdon Enterprises to model moss on the fallen tree limb and other areas near the water. Small tufts of grassy foam represent bushes growing from crevices in the rocks.



GROWING UP WITH LIONEL TRAINS IN MEXICO

MEMORIES OF THREE-RAIL SETS SOUTH OF THE BORDER

Story and photos by John Voogt

A bright spark jumped out at me as I held the two wires in my trembling hands.

I heard my father yell, "What are you doing Johnny?"

I was five or six years old, and an idea had popped into my head while playing with my small German clockwork train. Since I was fascinated with electric trains, I wanted to

The Lionel no. 1666E Pennsylvania Torpedo the author got for Christmas of 1958 poses on the three-rail layout he built in his bedroom in the middle 1960s. Now in his late 60s, John recalls the trains he enjoyed while his family lived in Mexico.

The O gauge railroad John put together in his basic featured quite a network of track and switches for his prewar trains. He added handmade structures and a painted backdrop, along with a Lionel no. 1861 lunaria control. Magazine scans consigned after World War II.

Lionel used its no. 2218 steam engine to haul five outfits in 1940. That's probably when the seafoam-green 2218 at the Puerto Air counterpoint store in Mexico City. Several years later, he acquired a 2218 from the Salvation Army Children's Home there.

I might get another set if I relentlessly recommend

My grandfather owned Del Carlo Drugs store on Broadway in Mount Vernon, New York, which carried Lionel trains. After school each day, I dropped by the pharmacy for ice cream and then walked to Proctor to admire the variety of trains. The fire-engine red, black-roofed 2343 Pennsylvania RR Trainmaster caught my attention, thanks to the bright red number lights on the front. I was the 1940 Pennsylvania RR Trainmaster. When I dropped by the store one afternoon right before Christmas, I was dismayed to see the O-27 set was gone.

I'm a borrower. I missed a flagship holiday like I ignored the fun to find an old 2023 which included the Trainmaster. I had been admiring, along with an 1800 Atlantic Atlantic and New England cars, the 2218 locomotive, 1680 tank car, and 1682 caboose. 1949 track and transformer.

Seeing great new toys

After our parents and I returned to Mexico City at the end of 1949, I came across a Lionel catalogue catalog for 1950. I loved going through it, and in the pages I discovered the new no. 2350, a 2-4-2 steam locomotive equipped with disc wheels. I was captivated by this beautiful engine and dreamed of owning one.

While our family was in the U.S., an old and well-established department store called El Puerto de Liverpool (the Port of Liverpool) had become Lionel's official dealer in Mexico. The store then sold trains licensed by a large set-door handling was likely from the main square of Mexico City, the capital city district, even since.

Shortly before Christmas 1950, Mother and I were shopping at the Liverpool

Where the doors of the elevator opened on the fourth floor, I saw a large Lionel layout.

A train of O-27 tubular track circled around a table measuring about 8 x 10 feet. Just inside that, three 3 short outer oval track with a switch to a siding that branched out into eight and mid-inside looking into a huge illuminated power

Each track had its corresponding price tag in both figures as an illustration. Prices ranged from seafoam-colored O gauge set to high-end 0-10 cars. As we rolling I saw the 2218 locomotive at the head of a freight train set no. 2679. When I saw the price tag of 595, I knew that, given my parents' limited resources, I [illegible] not even ask for it.

Among the Lionel bright and [illegible] on display was the prize of all the trains under us. [illegible] Hudson as the dual Chief set, as featured a no. 1689 scale Hudson and no. 2689 tender under blue and gold streamlined passenger cars [illegible] no. 750 vestibule baggage-mail, two no. 751 coaches and a no. 756 observation. The price of 695 pesos was equivalent to

Lionel items exported to Mexico

COMMON POSTWAR ITEMS WITH UNIQUE DISTRIBUTOR MARKINGS

Collectors of trains and accessories cataloged by Lionel during the first few years of the post-World War II period find fascinating models intended to be exported to Mexico. They are aware of a handful of freight cars and small operating items distinguished by decaled labels indicating a distributor in Mexico. Stampings on boxes also mark special pieces.

How much business Lionel conducted during the postwar years and postwar eras in Mexico is an unknown. In contrast to Lionel's uncertain

The most curious and valuable of the Lionel items associated with Mexico are examples of the no. 131 semaphore. Besides regular production signals with yellow blades (left), some semaphores feature blades painted red.

Some Lionel items had this label. It identified them as originally exported to a distributor handling Mexico.

[illegible] postal service to verify. Hundreds shipments of the Western Hemisphere [illegible] importance for the time.

Published lists of authorized service stations and retail [illegible] carrying Lionel trains did

[illegible] the salespersons who worked [illegible] the U.S. was still on.

A crowd would surround the table, watching the trains in operation. I obliviously [illegible] was transported into a toy train fairyland. Mesmerizing me was an O- [illegible] and my 2-rail, O27 Hudson and an Lionel® Hudson whistle smoke. They pulled four passenger cars (one an O27 Baggage car, new in the 2013 Rollbrooke), and a 6-27 electrolocomotive. The trains ran continuously on the round loop.

Nonetheless, the salesperson handling the Lionel shows was not the manager of the [illegible] owned on the power to the appropriate rolling, I went [illegible] train cars [illegible] around a few times, and then returned to look into the [illegible]. My blue [illegible] another train and I ran this around a few times before returning it into the station.

I waited for the operator to bring me the Rail Chief set with an eight-[illegible] and train assortment [illegible]. Unfortunately, during the half hour I stood by the layout the train [illegible] ran around a few times and then returned to look into the [illegible]. My blue [illegible] another train and I ran this around a few times before returning it into the station.

I waited for the operator to bring me the Rail Chief set with an eight-[illegible] and train assortment [illegible]. Unfortunately, during the half hour I stood by the layout the train [illegible] ran around a few times and then returned to look into the [illegible].

Complex levels

Right and, BELOW LEFT: A sample of the underground mine orchard within construction.

A couple of days out passed how been filled 'un-needed by many more and losing worth. It will be a sea of getting the work a and moving in more!

how many things a different job are different problems. The in-work wood is piles if there are the surface to work from.

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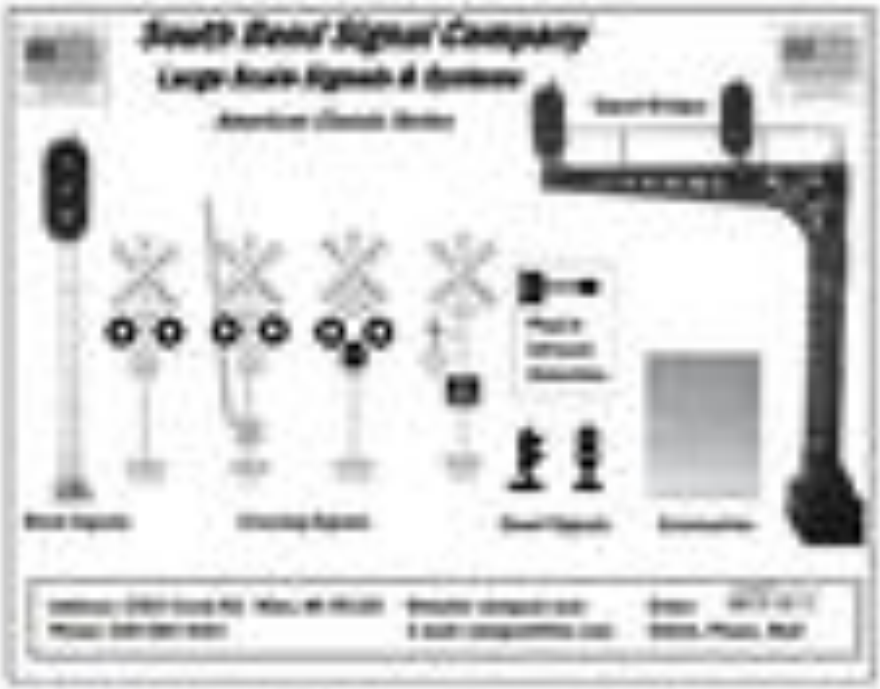

EVENTS

6–9 March, 2014: Irish Annual "Rails to the Gardens" Rails: Tullamore Railway Society, Tullamore, Co. Offaly • Details: e-mails, info@railsgardens.org • http://www.railsgardens.org

21–23 March, 2014: East Coast Large Scale Trains Show Public Rights Center, Public, PA. 23 Trains, Ho/On30 HO Scale Dioramas, Vendors, Clinics, Kids Activities, Food Vendors, Free Parking. Admission $10 Adults, $5 Children 6-12, Under 6 Free. Contact: Jeff Bell, 610-220-1000 or jeff@bellmail.com • Website: www.eastcoastlargescaletrains.com

4–7 April, 2014: Garden Trains 101 and Trains Workshop Lake Compounce Theme Park, Bristol, CT. Hands-on workshop for beginners and experienced operators. Learn how to build, operate and maintain a garden railroad. Contact: Lake Compounce Theme Park, 1-800-Wicked or info@lakecompounce.com • Website: www.lakecompounce.com

5 May, 2014: Spring Steam Show Rail Explorers, Inc., Wilmington, DE. Steam locomotive rides, Diesel locomotive rides, Handcars, Rail Bikes, Model Railroad Layouts, Vendors, Food, Kids Activities. Contact: Rail Explorers, Inc., 302-655-7245 or info@railexplorers.com • Website: www.railexplorers.com

10 May, 2014: Wild Railroad Days Railroad Museum of Pennsylvania, Strasburg, PA. Steam Locomotive Rides, Diesel Locomotive Rides, Model Railroad Layouts, Vendors, Food, Kids Activities. Contact: Railroad Museum of Pennsylvania, 717-687-8628 or info@rrmuseumpa.com • Website: www.rrmuseumpa.com

10 May, 2014: Lehigh Rail Fair Lehigh Valley Railroad Association, Wind Gap, PA. Model Railroad Layouts, Vendors, Food, Kids Activities. Contact: Lehigh Valley Railroad Association, 610-863-4290 or info@lvra.org • Website: www.lvra.org

16–18 June, 2014: West Coast Regional Show Sacramento Valley Garden Railroad Society • Event night and 2 days (Fri-Sun) • Approximately 4,000 sq. ft. • Admission $ 4.00 • Contact: Jeff Bell, 916-991-1234 or jeff@sacramentogardenrailroad.com • Website: www.sacramentogardenrailroad.com

22–27 June, 2014: "Rivalries" in Pennsylvania Big Trains Operation Club • Hershey, PA. • Bob Armitage, bmarmitage@gmail.com • Website: www.bigtrainsoperation.com

Future Garden Railway Conventions
2015: Denver, CO; late 6-10
2016: Troy, Ohio; 7-10

Event notices are published at no charge. Listings that would be helpful are deadlines and to be given available and be published. Send listings to Garden Railways, PO Box 820, Hudson, NH 03051, or e-mail to gardenrailways@kalmbach.com.

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ASK TRAINS

» This Month:
- Trains on the PGA Tour?
- Amtrak's P40Js
- Ann Arbor's ore jennies

The Providence & Worcester operates in four Northeastern states. Here, train 3853 passes the Thames River in Preston, Conn., on Sept. 1, 2009. Robert A. Lewis

Q I was watching a professional golf tournament being played in Cromwell, Conn., just south of Hartford. Who owns the rail line that passes between the 13th hole and the Connecticut River?

— David Mitchell, Franklin, Texas

Q Whatever became of Amtrak's P40s? They were numbered in the 800 series and looked very similar to the P40s in service today. What's the difference between them? Does Amtrak still have any mechanically sound P40Ps on the property? — Todd Cox, Santa Fe, N.M., Mitch Wright, New York, N.Y., and Bill Waugh, New York, N.Y.

Amtrak P40s Sub 4001 makes the first cut for retaining unit that turn it Rhode Isl., on June 7, 2004. Bob Johnston

Q Last year I saw a caboose on the tail end of a BNSF Railway train with P4000-reporting marks. Is it recycling the three-digit cars it took all of this time, and what does P4000 stand for?

— Timothy J. O'Keefe, Phoenix

This bright red caboose and its power (No. 999, Amtrak's special rail bonds unit) are owned by P4000 LLC. Photo by J. Parker

A Two cabooses, Nos. 346 and 442, are in that reporting mark, and they are currently owned by Minnesota-based specialized leaf transport. The reporting marks, however, refer to P4000 LLC, one of several Wisconsin companies that make up Cole Supreme Services.

Cole Supreme Warehousing Co. Inc., another of these companies acquired the cars in approximately 2002 and hired the Kansas St. Rail crew and Texas Pacific Railroad, Missouri & Iron Range Railroad, and completely rebuilt them to accompany

Q Did Grand Trunk's ore docks get to Michigan's Lower Peninsula via the Bob Hope's cartoons and take that car to Ohio? — Jeff Bell, Lakeland, Fla.

A Some say it was Superior & Ishpeming ore carriers that swam via the Soo Locks; cartoons showing ore boxcars at Ohio Ave. and 14th St. The cars were loaded at the Municipal Wharf on the Lake Michigan for the Ford Motor Co. foundry in Dearborn, Mich. The story has it that the car floating during the seasonal winter closing of the locks at Sault Ste. Marie.

After the cars were loaded on the cross-lake ferry and headed to the 12th St. Ohio docks, they disembarked to the Grand Trunk Western line. Remember that the car never to the Ohio River. Toledo & Ironton at Ironton, Mich., the delivery to the foundry at Dearborn.

The story on traffic was about the Soo Line. There were four cars paid the title and took on the cross-lake ferry. However, the traffic beach with one vessel carrying cabin. And since the car did load inside the ferry vessel.

So that was the most Soo Line boxcar (GNR 20-ft. steel 57-ft. boxcar) GNR's cars were bright before GB 1,014 is now in service, with the diesel engine removed, a displacer with an ice car and caboose before GNR's Passage has an deck on northeastern Michigan. — Robert C. Wiecinski, author of "The Soo Line Rail road in Color: History in Operations, 1949 to 2009," and J. Parker Lamb is a contributing engineer.

Have a question?

We welcome your questions about railroading, and will answer as many as space permits.

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In the current issue

Summer 2010 Edition

SPECIAL ISSUE!
A 50-page tribute to the E unit, 50 years after its introduction

E units, A through E
A model-by-model survey of the various models, from the diesel E1 of 1937 to the last E8 of 1964

Birth of the Warbonnet
GM designer shares recollections of creation railroading's most famous paint scheme for Santa Fe's E7

Advertising the E Unit
With ads in consumer magazines, Electro-Motive took its case for dieselization to the public

Streamliner Designer
In his work for Pullman-Standard and Electro-Motive, Alcott Hennessy shaped a new era of railroading

Of Hoops and Markers
Wyomissing days as a CNR depot in the early '50s led to a career in railroading

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The new platform at Mt Pleasant has one more stop but delights

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ELECTRIFYING NEWS
BACHMANN'S SOUND VALUE and DCC-READY GG-1s

The electric GG-1 has a unique streamlined design that captured the public's imagination when it was introduced in the 1930s. Our GG-1 is loaded with features to spark your interest, including all new tooling, die-cast frame, 12-wheel drive, twin operating metal pantographs that can operate from overhead wire if desired, soft white LED directional headlights with dimming function, and E-Z Mate® Mark II couplers. The DCC sound-equipped model includes our Sound Value SoundTrax® sound package with prototypical motors with blowers, pantograph extension and retraction, air compressors, short and long horns, and bell all in 16 bit polyphonic sound. The DCC-ready version has an 8-pin socket ready for DCC decoder installation of your choice. Visit your favorite hobby dealer to see why the arrival of the GG-1 is such electrifying news for HO modelers!

GG-1 ELECTRIC LOCOMOTIVE (DCC SOUND VALUE EQUIPPED)
SCALE 3.594-28 inch

Item No. 83301	PRR - [illegible]
Item No. 83302	PRR - [illegible]
Item No. 83303	PRR - [illegible]
Item No. 83304	PRR - [illegible]
Item No. 83305	PENN CENTRAL - BLACK with WHITE LETTERING #4913

Shipping Soon!

GG-1 ELECTRIC LOCOMOTIVE (DCC READY)
SCALE 3.204-28 inch

Item No. 83201	PRR - [illegible]
Item No. 83202	PRR - [illegible]
Item No. 83203	PRR - [illegible]
Item No. 83204	PRR - [illegible]
Item No. 83205	PENN CENTRAL - BLACK with WHITE LETTERING #4862

MTH ready-to-run train sets in HO scale feature sound and command control

Many model railroaders get started on the hobby with a train set. A loop of track, power pack, a locomotive, and rolling stock will have a new model railroader running trains in a matter of minutes. MTH has taken its ready-to-run sets a step further by including its Digital Command System (DCS) and a locomotive equipped with a wide variety of sound effects.

With the DCS system, you can run the train and trigger sound effects with an included wireless remote controller. The DCS-equipped locomotive also runs on direct-current (DC) and Digital Command Control (DCC) layouts. MTH also offers a non-sound DC set.

Train set up. The set includes an (0402) 0-6-0 diesel equipped with DCS and Proto-Sound 3.0, two freight cars and a caboose, 12 18" radius RealTrack curves, one 9" RealTrack straight section, and one 6" RealTrack terminal section. We tested the DCS version, which includes a 16-watt power supply, DCS Remote Commander infrared wireless receiver, and entry-level handheld controller. MTH also makes more sophisticated DCS iterations that provide access to all the features of DCS-equipped locomotives.

The RealTrack track sections fit together easily and securely. The grey plastic roadbed is removable. Additional curved and straight sections of track are available separately.

The heart of the train set is the DCS Remote Commander, which I set up in a couple of minutes. Two wires from the terminal track section connect to the DCS receiver. The power supply has a barrel jack that fits into the back of the receiver.

DCS operation. The handheld remote controller requires two 1.5-V batteries (not included). The controller has large buttons and is easy to use. I terminated and disconnected the speed of the locomotive and the diesel grew louder as it moved and decreased. The sound quality is clear, without any hiccups or rumble. I also activated the whistle, bell, and coupler crash effects. The remote can also trigger a three-part radio dialogue sequence between the train crew.

The receiver works with a two-rail right-rail/ground signal. The range of the remote is sufficient for anyone running trains on the supplied loop of track.

It should be noted that DCS is a proprietary system and isn't the same thing as DCC. While the Remote Commander system included in this set does not run with DCC-equipped locomotives,

DCS-equipped FA. The dimensions of the MTH (3402-1) on the set match prototype drawings in *The Model Railroader's Guidebook, Vol. 3* (Kalmbach Publishing Co., out of print). With light radiator bar, domes, and short pilot/steps along each side, the model is based on what railfans refer to as a Phase I F7.

Plain (and) means represents applied detail parts on the body shell. For the sealed-door exterior the prototype (training) Diesels are nothing have about the sides of the body over the area that detailed for them.

The set has a one-piece applied and the windows have dull glazing. The cab interior features printed side figures, a control stand, and a brake stand.

One unique aspect is documented in the locomotive. Typically it takes the [illegible]

The train set includes a loop of MTH RealTrack track with removable roadbed and a Digital Command System Remote Commander

In Highlighted in this issue

- [redacted]
- [redacted]
- [redacted]
- [redacted]

The intuitive wireless controller is easy to use. It can control the locomotive speed and direction as well as trigger some sound effects.

[redacted] sharp-edged paint scheme. Paint coverage is smooth with sharp color separation. Colonial Western Electric Alcatel Christiana Western's gloss and pinstripe are both well above the mean mark.

A few concerns. Our Crown coupler and one additional arrive as noted in the locomotive brackets. Unlock off the 3-D knob itself. A die-cast metal frame secures the motor and flywheels. The printed circuit board for the DCX system is mounted on top of the frame. The speaker and a master antenna (used) both are on the bottom of the die-cast metal frame.

Locomotive performance. The DCX electronics on the F3 are the same as those included in one of the two MTH locomotives. After running the F3 on the test track, I noted that locomotives on two DC and DCX test tracks. Note that in DC the locomotive is designed for up to 14 volts, which is double our standard DC test. In both cases the model performed smoothly throughout its speed range.

I was especially impressed with its slow-speed performance in DCX. At first I set the locomotive to 128-speed steps. It crept along at 1 scale mph.

Testing the sound side was mixed. Besides [redacted] Railroad sounds and the MTH PA-1 Digital Commander gets the access to all 28 functions. Additional sound functions include brakes, sirens, and grade crossing horn signals. The cars do more or less the engine runs sounds regardless of the locomotive's speed.

Like other DCX-equipped locomotives, the F3 can only be programmed on the track. Programming is limited to the short and extended addresses, acceleration rate, and decelerate rate.

The parallel-connected couplers can be replaced with MTH Proto-Couplers (sold separately). These scissor-opening couplers can be controlled with the handheld controller included with the set or with a DCX- or DCS-capable

Rolling stock. The freight cars in the set include a 10 and two flat hopper with removable coal load, a 70-ton well gondola, and a boxcar. The cars have laser-etched on their sides. The cars have laser-etched on their sides. The cars have laser-etched on their sides.

The plastic cars have simply molded trim work, undefined, resin gear, and other details. The interior of the gondola has a molded wood floor and no details. The interior of the hopper has subdivisions and no detail. There are also rivets on top of the rails, which is a nice touch. The caboose has clear glazing in all its windows. All the cars have separately applied brake wheels.

The models' lettering and graphics are straight and sharp. There are minor over-runs in printing and painting errors that are barely visible. Regardless, the cars look great in their prototypes. The car roofs don't have any lettering. However, I appreciate that MTH chose a car number for each model that was correct for the style of car being represented.

Last is a model equipped F3. The MTH DCX Freight set offers a good entry point into model railroading. —*Steve Kmiecik, senior editor*

MTH ready-to-run [redacted]

Price: [redacted]

Manufacturer:
MTH Electric Trains
[redacted]
[redacted]
www.mthtrains.com

Road names: Pennsylvania, Tuscola & Santa Fe, Pennsylvania, Fantasy paint scheme, Christmas, Fantasy (reindeer), Work, MP&W

Features:

- 50-watt/16-volt power supply
- 18" x 40" (R1) Rail/Truss axle
- All-wheel drive and electrical pickup on locomotive
- Digital Command System with wireless remote controller (DCS version only)
- Eight-pin DCC socket in locomotive (DC version only)
- Five-pole skew-wound motor with dual brass flywheels in locomotive
- Knuckle compatible knuckle couplers on correct height
- Pressure-cast 3-D equipped locomotive (DCS version only)
- Minimum radius: 36"
- All (4) cardanic motor wheelsets in gauge
- Weight: 16 ounces (locomotive)

[redacted] scale (1) scale (DCS)

[redacted]

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[redacted]

Penn Central's "rainbow fleet" passenger cars come to N scale via Kato USA

Work from home again. It's inevitable now: late N scale and the short-lived Penn Central's passenger fleet, he would have were pondering and debating prospects ahead. Now Kato has released its groundbreaking GG1 electric locomotive and some passenger cars to accurate PC paint schemes.

The brief PC era. On Feb. 1, 1968, the New York Central and the Pennsylvania RR merged to become Penn Central, which at the time was the country's largest railroad company. In 1969 Penn Central absorbed the New York, New Haven & Hartford RR, including their diverse rolling stock. Penn Central owned 4% percent of the nation's passenger equipment in the United States.

The rush-merged PC used simplified paint schemes on its passenger cars, often just adding a new name or number and the PC logo. Likewise, the GG1 electric locomotives that PC inherited from the Pennsy received a Sparrow black and white paint scheme. Like its predecessors, the PC used GG1s on electrified lines from New York to Harrisburg, Pa., and Philadelphia to Washington, D.C.

By 1971, Penn Central owned 20% of passenger equipment in America. The bankrupt PC hung on to its freight lines for a few more years until the railroad became part of Conrail in 1976.

GG1. I reviewed the Kato GG1 in the January 2009 *Model Railroader*. The model's dimensions match drawings published by *Model Railroader* in the October 1970 issue. The plastic body shell has already molded detail with separately applied cab ladders and windows safety bars. The blackened metal pantographs are unbelievable.

The paint scheme matches prototype photos of PC no. 4861. All the lettering is straight and sharp.

The model has a smooth mechanism. The GG1 crept along at 1.5 scale mph. Its top speed of 125 scale mph is higher than the prototype's 100 mph top speed.

Removing the cotter pin places truck shell and the plastic cover on top of the split-die cast metal frame reveals the powered can-motor (PC) board. There are two yellow light-emitting diodes (LEDs) on each end of the PC board. These LEDs illuminate the model's headlights automatically according to the locomotive's direction, which isn't prototypical.

Modelers who want to convert the GG1 to Digital Command Control (DCC) have a few options. Bunch-style sound decoders are available from Digitrax (part no. DN163K1D) and Train Control Systems (part no. 4-CDN-NC). A board-type sound DCC sound decoder is available from Model Rectifier Corp. (See the review on the next page).

Kato also sells GG1s decorated for PC no. 4913, as well as two additional numbers in the black and white Amtrak scheme. For those modeling the late-transition years of the PC, an Electric Marine Olympic E44-diesel decorated for PC is also available. (Visit KalmbachHobbyStore.com/KAT-106-112 for more of the Kato N scale GG1 in the July 2011 MR.—Ed.)

Passenger cars. The models were built in the Kato N scale Broadway Limited and City of Los Angeles trains that I reviewed in the March 2008 and July 2011 issues. The cars have prime N plastic bodies and interior lighting kits are available (part no. 11-2408).

The four-car Penn Central passenger set included 84-seat coach no. 8449, 22-duplex roomette, 6-double bedroom Cafe/observation/lounge Coach, coach no. 1155, and 4-bedroom 2-compartment 1-drawing room sleeper-observation Twin. The paint schemes of these models match prototype photos in the Penn Central Color & Freight and Passenger Equipment Following two Books.

Imperial Twin, Cafe/observation/lounge Coach, and coach no. 1121 are ex-PRR cars. Originally built for Rail of a 21-roomette sleeper, no. 1121 was converted into a 4-6 and coach-lounge for Penn Central service. The model shown on the box the interior for the sleeper.

Penn Central no. 8449 was a 60-seat coach purchased from the Union Pacific by the PC. This coach and the other three cars served as several after 1971.

If I had to model a complete passenger train with only four cars, I'd probably want to remember additional cars to make up a complete train.

Kato is offering another four car set consisting of Harlan Cafe/observation, 60-seat, and Super Chief passenger equipment decorated in the plain Central paint scheme. Matching Kato GG1 and EMD E8A locomotives are also available. See www.katousa.com for more information.

There are plans afoot from Kato to make a roster for N scalers to model a unique era in American railroading. —Steve Kmiecik, senior editor

The Kato passenger car set includes this former Pennsylvania RR sleeper.

N scale E61 and car

Prices: $109 (locomotive); $100 (four-car set)
Manufacturer
Kato USA
100 Remington Road
Schaumburg, IL 60173
katousa.com
Era: 1998 to 2011
Locomotive features
- Blackened metal wheels in pairs
- Can motor with dual mass flywheels
- Electrical pickup on 10 drivers (Two drivers have traction tires)
- Kato knuckle couplers at correct height
- Minimum radius: 9½"
- Weight: 3 ounces

Passenger car features
- Kato knuckle couplers at correct height
- Low-profile metal wheels in pairs
- Minimum radius: 9"
- Weight: 7½ ounces

Kato N scale E61

[illegible]	[illegible]
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N scale insulated boxcar

Price: $25.10 to $29.40 each
Manufacturer
Eastern Seaboard Models Corp.
PO Box 304
Wallabeck, N.J. 07460-0304
www.esmc.com
Road names: Bangor & Aroostook "potato reefer," Canadian Pacific, Cotrell, New Haven, Penn Central
Era: 1961 to the mid-1970s
Features:
- Authentic period paint schemes with multiple car numbers
- Body-mounted Micro-Trains Magne-Matic knuckle couplers
- Micro-Trains AAR trucks
- Multiple numbers in each scheme
- End alley underbody

The colorful N scale boxcar is a model of the original "blue of Maine" insulated and heated cars purchased by the Bangor & Aroostook (B) in 1951 and 1952. They were part of a $10 car order built by Magor Car Co. and were the first cars to carry the railroad's distinctive red, white, and blue paint scheme and "Blue of Maine products" slogan. The first road name cars to hold future N product runs long during the fall harvest season, using the boxcars to load seafood and paper products the rest of the year.

The model. Our sample have a well-detailed plastic body with individually applied feather-edged sides, a heater, and an underframe and roof that are cast in gray plastic. All the parts are crisply molded and fit together well. The underframe includes simulated floorboards and a molded plastic AB brake system. The car weighs 1 ounce, which matches the Railroad Model Craftsman's recommendations.

The wooden-look Magor Weld-Lok sides have separate strips that are finely detailed at the seams height. The manufacturer of American Railroads also measure exactly match the 5'10½" standard gauge.

The sample cars were neatly decorated in a variety of authentic paint schemes representing different eras. The sides can be read under magnification. Check the manufacturer's website for current road names of the different road names.

Overall, these cars are both sharp models of a popular and colorful prototype. — Dan Hodges, senior editor

The condensing heater is only added to the model if its prototype had one.

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Product Reviews

An MR quick look: HO scale hybrid I-5 4-6-4

Price: $400.00
Manufacturer:
Broadway Limited Imports
6 Digital Way - Ste. 2
Cincinnati Beach, FL 32725
www.broadwaylimited.com
Description: Metal-wound-
excavator HO steam locomotive
Comments: Yet I-5 is a steam-
locomotive-person on the New
York, New Haven & Hartford from
1937 until 1951. I-4 passed the HO
Broadway Limited Museum before
full release I-5 in the December
2007 Model Railroader. I was after
some proven BLI hybrid locomo-
tives, the hybrid I-5 is made of
metal and plastic components.

The hybrid I-5 features many
separately applied detail parts. All
lettering and striping match
prototype photos.

Like the steam version, the
hybrid I-5 features a Dh Quantum
sound decoder. The sounds are
top notch in both DC and DCC.

All the wheels are in gauge and
the coupler on the rear of the
tender is at the correct height.

The model has a five pole
down-around motor, and its
performance matches the steam
version. The I-5 pulls the equiva-
lent of 38 HO scale passenger
cars on straight and level track.
The locomotive negotiated a 22"
curve without problems.

The BLI hybrid I-5 is a great
model of these classic locomotives. Highly recommended. — J.K.

MR Quick Look: Wood HO and On2½ bridge

Price: $41.95
Manufacturer:
Model Structures for
Model Railroads
4001 East Hanover Street
Mesa, AZ 85205
www.modelstructures.com
Description: Assembled wood
Warren truss bridge
Comments: In June manufacturer
Model Structures for Model
Railroads, is entering the hobby
market with a line of fully assem-
bled bridges made of wenge, an
exotic hardwood with a naturally
dark finish.

Through our sample, a Warren
truss span, is marketed as being
appropriate for HO or On2½
railroads. It would fit better on the
latter. In HO scale, the smallest
windows would be 10 inches
square and 10 feet long. It's
modeled a truss bridge that may
would have been built of wood.

The model's construction
makes it quite durable. I supported
the ends of the bridge on two
heavy columns of blocks that
model track nicely and stacked
more on top. It supported 10
years worth of MR without a crack
or sag.

Our sample was 14 inches long
(357.5 mm) scale feet or 35 (1 scale
foot) or 10-inch section (120 HO
scale feet or 78 (1 scale foot) is
available for $74.95. Other bridges
and components, including other
scales, are also offered on the
manufacturer's Web site.

This bridge is a well-made
piece into the model railroad
market. Its rustic look is perfect
for a mining or logging line. —
Steven Otte, associate editor

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WALTHERS

A Rio Grande tunnel motor leads a freight through a gravity crossing on Philippe Copper's 1-scale shelf layout, 1:64 Railroad Shop, Philippe, Forte, Paris, France. Sold the 1-foot-long layout section as a tribute to the explosion of American architecture. All structures on the layout are duplicates of historical prototypes. Philippe took the photo outdoors in natural light.

■ A view of Scottsville Junction train on the trestle at Le Roy as it crosses the creek above a bustling logging camp on the Pennsylvania, Maryland & Chesapeake RR. The 1913 scale layout belongs to Rob Charles of Waterbury Center, Vt. The PRMC will be open for tours during the National Model Railroad Association Northeast Regional Convention in Burlington, Vt., Sept. 9–12, 2015. For convention details, go to [illegible]. Robert M. Hendricks photo

EVERGREEN

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Tony Koester

Matching paint

Those three CSX locomotives on a freight heading west from Warren, Ohio, to Cleveland in August 2010 illustrate why matching prototype paint colors is at least an elusive quest. Wear, fading, and dirt a plus a few factors. Tony Koester photo

One of the hardest steps to start a finish-equipment-viewing marathon is to ask what color a railroad painted its stuff. It doesn't matter whether you're talking about locomotives or passenger cars or freight cars or cabooses or even freestyle structures. The debate will begin. And we're off.

One of the classic examples is the Pennsylvania RR's "Brunswick Green," born on the project lights on a clean locomotive, the greenish hue is quite apparent. And it's also one to understand why those with less discriminating color perception may say, "Isn't that black to me?"

Those of us who model a smaller railroad have one more color layer. I'd say that 90 percent of the United Plate Road cabooses sent us display have a white cupola (along the roof) embarrassed with the railroad's well-known "United Plate (high-speed service)" slogan. The problem is that those stripes were painted a color called "aluminum gray," the silver versions of Pullmans (or insulated grey).

The railroad's original goal, of course, was to have the cupola look "worked." Only, the normally gleam of the late 1940s quickly weathered to a blackish color as correspondence from the Pennsylvania (ret), shops reveals. Photos confirm that the cupola was noticeably darker than the gray white. Harsh PJ's in Brunswick were "shining [bright] blank to have weathered when new passengers folks didn't seem to see the [the] blank weathered cupola [was] on the roof. Models weathered cupola [was] on the roof. Models weathered cupola [was] on the roof. Models

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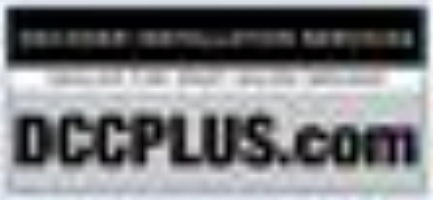
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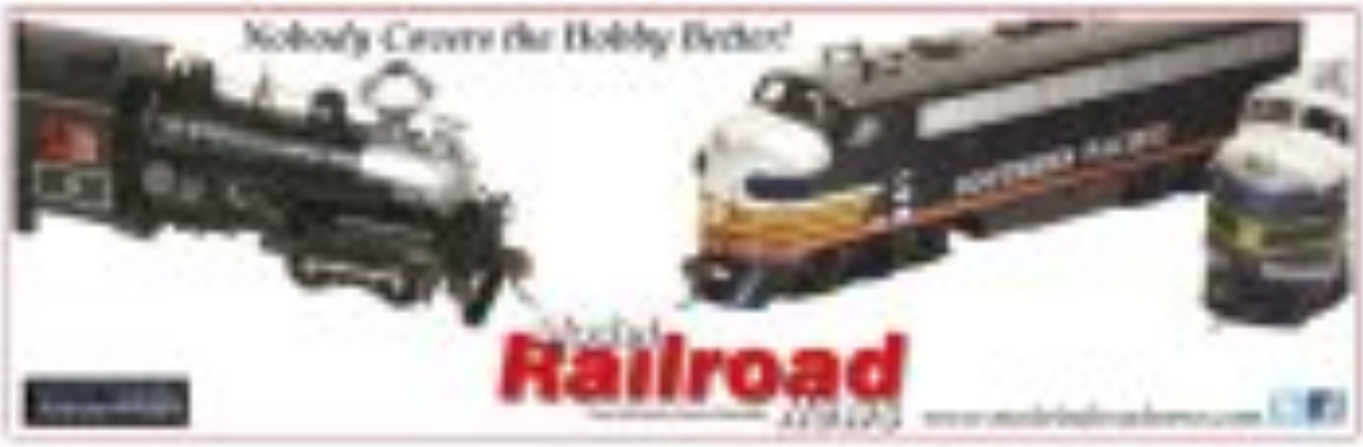
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TIMEFRAMES

Nashville, Chattanooga & St. Louis Railway engine #710 pulls a passenger consist in the spring of 1949 at the Tennessee Valley Railroad Museum, located next door to the NMRA headquarters in Chattanooga, Tenn. The 1911 was built in 1939 for the N&C. The engine became Louisville & Nashville Railroad #478 as part of the 1957 merger and was later obtained by Amoco, who used it in maintenance service at Joliet #710. Finally in 2004, it was purchased by TVRM who recorded it as #710 and it is now in use for special passenger trains in Tennessee and North Georgia. (Thomas Hildebrand photo) With more than 20,000 images cataloged and more than 140,000 images readily accessible, the NMRA library is your best source for prototype photographs. Call or write to the Kalmbach Memorial Library at the contact listed on Page 4 for more information.

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